DOCUMENT RESUME

ED 146 125 95 SP 011 730

AUTHOR	McCollum, John A.; Davis, Rose Marie
TITLE	Instructor's Manual: Development of Higher Level Thinking Abilities.
INSTITUTION	Northwest Regional Educational Lab., Portland, Oreg.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C.
PUB DATE	72
NOTE	611p.; Some pages may not reproduce well due to the paper color
EDRS PRICE	MF-$1.16 HC-$32.81 Plus Postage.
DESCRIPTORS	*Institutes (Training Programs); Instructional Materials; *Leaders Guides; *Learning Processes; Manuals; Research Utilization; Skill Development; *Teacher Education; *Thought Processes

ABSTRACT

This training manual is designed for use by instructional leaders conducting a workshop on the translation and application of research on "thinking processes" into implemented programs of instruction. The objectives of such a program is to develop teacher skills in relating thinking processes to a structure of knowledge (factual base--concepts--generalizations). Specific objectives for instructional leaders are the development of leadership skills in the areas of (1) open, active learning processes; (2) human relations; (3) conduct of simulation, laboratory, and application activities; (4) curriculum development; and (5) self-evaluation. Content of the manual includes a participant materials list, description of instructional format, preinstructional arrangements, orientation, rationale for change, and overview of the training procedure. All participant materials are also included. Processes discussed are: curriculum development, concept formation, sensitivity to data interpretation, learning experiences, interpretation of information displays, and application of knowledge. A review of materials covered concludes the program: a bibliography and glossary of terms are appended. (MJB)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED146125

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

E. Tyler

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

INSTRUCTOR'S MANUAL:

DEVELOPMENT OF HIGHER LEVEL THINKING ABILITIES

John A. McCollum
Rose Marie Davis
Southern Oregon College
Ashland, Oregon

SP011 730

Northwest Regional Educational Laboratory

DEVELOPMENT OF HIGHER LEVEL THINKING ABILITIES

This work was developed under a contract with the U. S. Office of Education, Department of Health, Education and Welfare. However, the content does not necessarily reflect the position or policy of that Agency, and no official endorsement of these materials should be inferred.

ED149152

© Copyright 1972 by the Northwest Regional Educational Laboratory

Copyright is claimed until October 1977. Thereafter, all portions of this work covered by this copyright will be in the public domain.

All rights reserved. No part of this book may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without permission in writing from the Publisher.

Edited by Saralie B. Northam
Typing and artwork by Anita L. La Russo

Published by Commercial-Educational Distributing Services
P. O. Box 3711
Portland, Oregon 97208

Printed in the United States of America

PREFACE

In recent years, a great deal of educational and psychological research activity has centered on the development of "thinking processes." This manual is designed for instructional leaders who have as their responsibility the translation and application of that research to an implemented program of instruction for the classroom.

This training program had its beginning in a workshop for Oregon educators presented at Southern Oregon College in the summer of 1965. Over the next two years an instructional model was designed, tested and refined. Its intent was the development of skill in using strategies to promote the thinking processes of learners. That initial model focused upon processes quite independent of specific subject matter. However, the writers became increasingly convinced that process cannot be effectively applied except as it operates on a body of subject matter. Testing of the initial model produced considerable evidence of the enthusiasm of participants while engaged in the workshop activities, but little evidence of their success in direct application of the processes to the body of knowledge that they were required to teach.

Consequently, during the past three years, the writers have designed, tested and refined an instructional program which makes a direct application of a structure of process to a structure of knowledge. Within the training program, participants are provided with the skills necessary to make this application, and are required to program an instructional sequence which demonstrates these skills. Also, within the instructional setting, each participant is required to take part in a series of practicum experiences in which he teaches the processes under observation with feedback on his teaching behavior. This program's strategies for interrelating process, content and practical experience should make it a useful tool in the urgent task of putting thinking processes into the classroom immediately.

The writers are indebted to many people for their contributions toward making this instructional program a reality. These include all of the individuals who were involved in the pioneering of this program; most particularly, Dr. James Hills and Miss Mary Durkin of San Francisco State College and Dr. William Ward, then Director of Teacher Education, Oregon State Department of Education. We are also very grateful to all of the participants and leaders of the many workshops which have been held throughout the Northwest during the past four years. Their ideas, suggestions and criticisms have been invaluable.

Special gratitude is also expressed to Mrs. Alice Duvall, then the Field Coordinator for the Northwest Regional Educational Laboratory. During the initial development of this instructional program, the writers worked directly with Alice. As a result, many of the activities finally presented are based upon her ideas and the dialogue which took place at that time.

Preface

A very special debt of gratitude is owed to our initial editor, Mr. Robert DeVoe, Assistant Professor of English, Southern Oregon College. Bob not only met the challenge of editing the sometimes uncommunicative expressions of the writers, but his perceptive understanding of the teaching process resulted in additions and modifications in content, format and style which have added greatly to the effectiveness of the program. Also, Bob is an artist in his own right and it is his very fine artistic talent that is evident in the illustrations that follow.

Appreciation should also be expressed to Dr. John L. Holmes, Principal, Lincoln Laboratory School, Ashland, Oregon. He has been extremely helpful, patient and understanding toward the many tasks relating to the final development of the manuscript.

Finally, the writers owe a great debt of gratitude to the late Dr. Hilda Taba. Her genius for creating, developing and conceptualizing strategies for the improvement of teaching resulted in the basic underlying elements of this program.

JAM
RMD

August 1972

CONTENTS

Preface	iii
Contents	v
Participant Materials List	vii
Materials List	xi
Introduction	1
Instructional Format	10
Preinstructional Arrangements	25
Orientation	37
Rationale for Change	52
Overview of the Processes	78
Curriculum Development	124
Sensitivity to Questions	177
Sensitivity to Concept Diagnosis	194
Processes in Concept Diagnosis	199
Exercises on Concept Diagnosis	213
Demonstration of Concept Diagnosis	237
Typescript Analysis of Concept Diagnosis (OPTIONAL)	263
Concept Diagnosis Laboratory Experience	292
Sensitivity to Interpretation of Data: Literature	302
Processes in Interpretation of Data	316
Exercises in Interpretation of Data: Literature	331
Interpretation of Data Laboratory Experience	346
Interpretation of Data: Films	352
Processes with Learning Experiences	361
Exercises in Selecting and Programing Learning Experiences	379
Sensitivity to Interpreting an Information Display	394

Contents

Processes in Interpretation of an Information Display 398

Exercises for Interpreting an Information Display 406

Demonstration of Interpreting an Information Display 419

Interpreting an Information Display Laboratory Experience 446

Sensitivity to Application of Knowledge 466

Processes in Application of Knowledge 477

Exercises in Application of Knowledge 495

Demonstration of Application of Knowledge 504

Application of Knowledge Laboratory Experience 529

Review of Processes 537

Bibliography 555

Appendix A: Glossary of Terms 558

PARTICIPANT MATERIALS LIST

Orientation
- Content Summary 44
- Instructional Objectives 46
- Instructional Model 47
- Instructional Themes 49
- Postsession Reaction Form 50

Rationale For Change
- The Rationale For Change 59
- Reaction to The Rationale For Change 73
- Five Dimensions of Group Growth 74

Overview of the Processes
- Overview of the Processes 102

Curriculum Development
- A Rationale for Curriculum Development 142
- Classification of Knowledge 154
- Analysis of Generalizations 156
- Selecting a Structure of Knowledge 157
- Building an Illustrative Model 159
- Japan and India 160

Sensitivity to Questions
- Questioning 190
- Sensitivity to Questions 192

Processes in Concept Diagnosis
- Processes in Concept Diagnosis 201

Exercises on Concept Diagnosis
- Opening Questions 224
- Discussion Skills For Listing Process 225
- Excerpt From Listing Process, Bolivia 226
- Discussion Skills For Grouping Process 229
- Excerpt From Grouping Process, Bolivia 231
- Discussion Skills For Labeling Process 234
- Excerpt From Labeling Process, Bolivia 235

Demonstration of Concept Diagnosis
- Concept Diagnosis Typescript 243
- Concept Diagnosis Observation Guide 261

Typescript Analysis of Concept Diagnosis (OPTIONAL)
- Analysis Exercise, South America 282

Concept Diagnosis Laboratory Experience
- Concept Diagnosis Observation Guide 299

Sensitivity to Interpretation of Data: Literature
- *The Golden Crane* 306

Participant Materials List

Processes in Interpretation of Data

Processes in Interpretation of Data 318

Exercises in Interpretation of Data: Literature

Typescript 1 337
Typescript 2 339
Analysis of Question Sequences 344
Scrambled Question Sequence 345

Interpretation of Data Laboratory Experience

The Generalizing Process 351

Interpretation of Data: Films

Interpretation of Data Observation Guide 358

Processes with Learning Experiences

Learning Experiences 363

Exercises in Selecting and Programing Learning Experiences

Exercise in Selecting Learning Experiences 385
Exercise in Programing Learning Experiences 386
Learning Experiences 387
Exercise in Organizing an Information Display 388
Research Notes on Japan and India 389

Processes in Interpretation of an Information Display

Processes in Interpretation of an Information Display 400

Exercises for Interpreting an Information Display

Restricting Words 414
Two Colonies of People 415
Scrambled Question Sequence: Interpreting Factual Data 416
Pursuing an Individual Response 417
Evaluating Generalizations 418

Demonstration of Interpreting an Information Display

Japan and India Information Display 427
Interpretation of Data Typescript 431
Interpretation of Data Observation Guide 443

Interpreting an Information Display Laboratory Experience

Interpretation of Data Observation Guide 452
Illustrative Models of Generalizations 455
Suggestions for Primary Teachers 464

Sensitivity to Application of Knowledge

An Information Display 473
A Fact Sheet on Iraq 475

Processes in Application of Knowledge

Processes in Application of Knowledge 479

Participant Materials List

Exercises in Application of Knowledge
    Analysis of Opening Questions 500
    Discussion Techniques 501
    Second Grade Example for Application of Knowledge 502

Demonstration of Application of Knowledge
    Application of Knowledge Typescript 513
    Application of Knowledge Observation Guide 526

Application of Knowledge Laboratory Experience
    Application of Knowledge Sample Questions 534
    Application of Knowledge Observation Guide 535

Review of Processes
    Thinking Processes Review 541
    Strategy Moves 542
    Bibliography 555

Appendix A: Glossary of Terms 558

MATERIALS LIST

Development of Higher Level Thinking Abilities Instructor's Manual (2 Volumns) By J. McCollum and R. M. Davis	Commercial-Educational Distributing Services P. O. Box 3711 Portland, Oregon 97208	$15.00
Development of Higher Level Thinking Abilities Participant Materials By J. McCollum and R. M. Davis	Commercial-Educational Distributing Services	$10.50

A film dealing with feelings and contrasting culture. Those suggested are:

Japanese Boy, The Story of Taro Order No. 2053 (Color) $265.00 Order No. 2054 (B & W) 135.00	Encyclopaedia Britannica Educational Corporation 425 N. Michigan Avenue Chicago, Illinois 60611
Mexican Boy, The Story of Pablo Order No. 1833 (Color) $296.00 Order No. 1834 (B & W) 151.00	Encyclopaedia Britannica
Film Projector (16mm)	Local
Chalkboard and Chalk	Local
Newsprint and Felt-Tip Pens	Local
Masking Tape	Local
Graph Paper	Local
World Map	Local

INTRODUCTION

Rationale

During the past decade, a great deal of educational research activity has been focused on techniques for improving the thinking ability of learners. The urgent need for this research is clear when one considers the explosion of knowledge which places on every adult of today and of the future a constant demand to be self-generative in the learning process. The notion of memorizing a static body of factual knowledge applicable to all situations has become absurd. In a world of rapidly expanding knowledge, and dramatically changing scientific, social and economic phenomena, the individual who is unable to assimilate large bodies of knowledge, to relate this information to a previously learned knowledge base, and to discover new knowledge and skills has little chance of being an effective participant. The classroom which operates solely or mainly at the level of factual knowledge, utilizing only the processes of memorization and recall, is performing a gross disservice to today's learners.

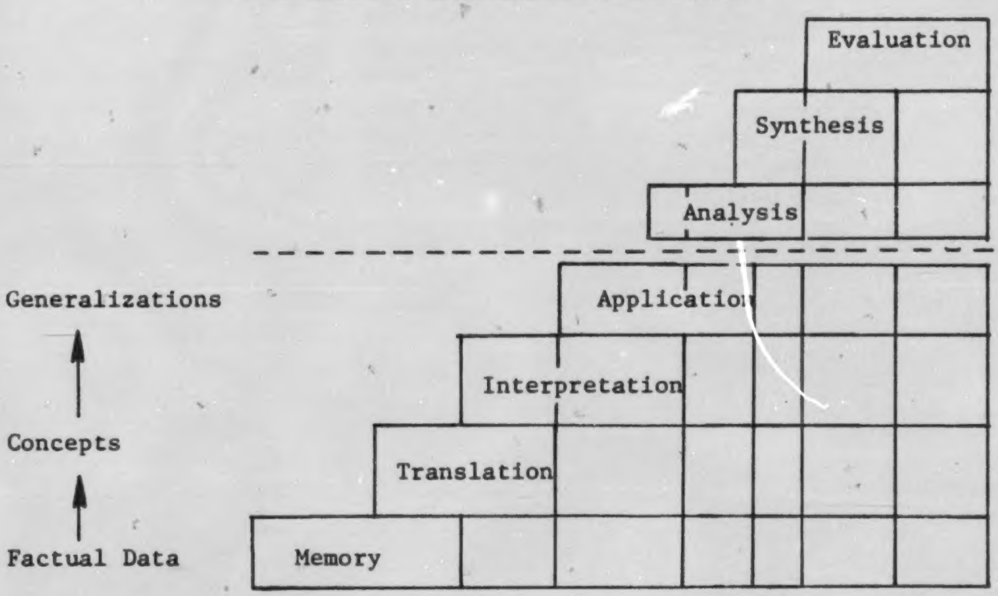
Program Objective

Basically, this training program is designed to develop understanding of, and skill in, relating a structure of process to a structure of knowledge. More specifically, structure of knowledge refers to a hierarchy starting with (a) factual data, proceeding to the organization and categorization of factual data according to (b) concepts, then to the analysis of relationships between concepts and the discovery and expression of (c) generalizations which can be logically supported by the data.

Introduction

The structure of learning process related to this hierarchy of knowledge begins with (a) the *recall* of previously learned or memorized data, moves to (b) the *translation* or organization of specific data according to concepts, to (c) the *interpretation* and statement of relationships, generalizations, inferences and principles, and finally to (d) the *application* of discovered knowledge to new or different situations. The end goal is one of creating autonomous learners; learners who are able to function independently in the learning process.

Structure of Knowledge and Learning



Introduction

Research Base

The thinking processes presented in this program are based upon the research activities of the late Dr. Hilda Taba. From 1959, until her untimely death in 1967, Dr. Taba's research centered upon the examination of teaching strategies which promote the thinking abilities of children. Primary sources of Dr. Taba's research which have been utilized in the development of this program are:

Taba, Hilda. Curriculum Development: Theory and Practice. New York: Harcourt, Brace and World, Inc., 1962.

Taba, Hilda. Teaching Strategies and Cognitive Functioning in Elementary School Children, Cooperative Research Project No. 2404. San Francisco State College, 1966.

The theoretical framework for cognitive functioning which underlies this program has been developed by relating Dr. Taba's research to the work of Bloom and Saunders.

Bloom, Benjamin S. Taxonomy of Educational Objectives, Handbook I, Cognitive Domain. New York: David McKay Co., Inc., 1956.

Saunders, Norris M. Classroom Questions, What Kinds? New York: Harper and Row, 1960.

The contribution of the present writers consists of integrating the work of these researchers and devising the specific instructional content and organization of the program.

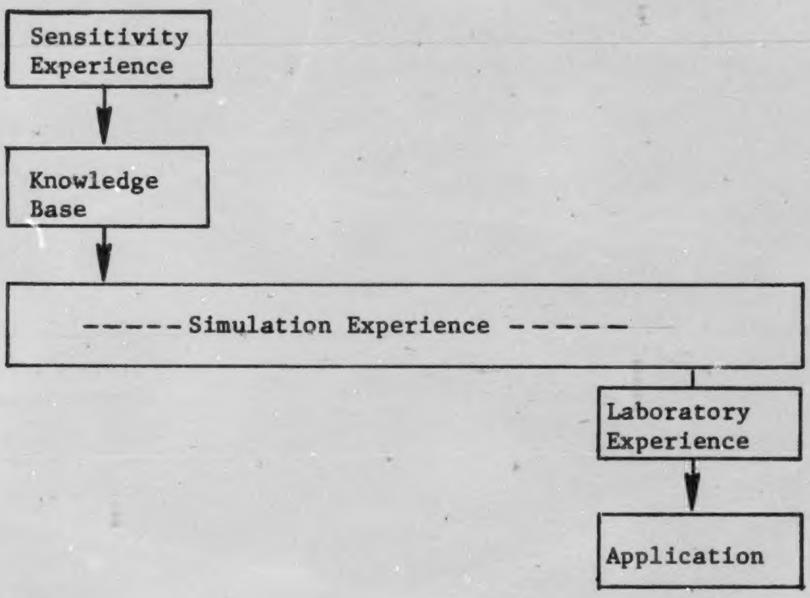
Introduction

Overview of the Training Program

The training program has three basic characteristics which have proven quite effective towards high participant achievement:

1. Training Model

   Instruction is presented by a series of rotations through the following steps:



Sensitivity Experiences

Sensitivity experiences are an introductory activity for each of the cognitive processes presented. With the instructor playing the role of a classroom teacher, and the participants as students, each thinking process is introduced through role playing. The purpose of this activity is to provide an initial encounter with the process which involves participants emotionally as well as intellectually.

Introduction

Knowledge Base

Following each sensitivity experience, a short, didactic presentation on theory and technique is given. The purpose of this activity is to provide another encounter which will serve as a basis for subsequent activites. (Understanding and skill is developed by progression through the total training model. The knowledge base presentations serve only as a theoretical basis for subsequent activities.)

Simulation Experiences

Each of the thinking processes is broken down into its component parts and simulated. In other words, a specific strategy within a thinking process is studied by participants actively engaged in the process itself. Learning takes place through active dialogue between participants when confronted with a problem situation. For example, at one point, participants are given a set of randomly organized questions designed to be used for interpreting feelings and values. Participants, working in small groups, are asked to sequence and refine the questions to achieve their intended goal, and to verbalize a rationale for what was done. Specific criteria for self-evaluation evolve from the group.

Laboratory Experiences

The laboratory experience involves the individual participant in teaching each of the processes in a classroom setting, under observation, with systematic data collection and feedback on his behavior. This is considered an ESSENTIAL component of the training model.

Application

Each participant is asked to program an instructional sequence in his chosen curriculum area which utilizes the processes presented.

2. Relationship of Process to Knowledge

In order to illustrate very specifically how a structure of process can be related to a structure of knowledge, a model curriculum sequence operates as an instructional sample throughout the training program. A social studies unit which compares and contrasts Japan and India has been chosen for this purpose. All sensitivity experiences, curriculum development activities and knowledge base presentations are related to this sample. Applications to other curriculum areas and instructional modes are made from this exemplary framework.

3. Teaching Mode

A sincere effort has been made in this training program to "practice what we preach." The content of the program consists of a method designed to develop autonomous learners, learners who have the understanding and skill to function independently. Consequently, an effort has been made to create the same learning conditions for participants in this training program through open dialogue and the freedom to inquire, explore and utilize according to the individual needs and abilities of the participants.

Introduction

Indeed, from the instructor's point of view, it may first appear that whatever freedom and flexibility the program affords lies with the participants and not with the leader. He may feel that the materials of the program are too tightly structured and too thoroughly developed to allow him more than an automaton's role in their presentation. In response to his anticipated discomfort it should be pointed out first that those materials which seem to supply words for his mouth (question sequences, explanations, etc.) should be regarded only as models or prototypes of presentation. He is encouraged to adapt such materials to his own style of presentation. Secondly, because this training program is very centrally concerned with the learning process and effective structuring of that process, it attempts to exemplify an effective structure within itself. As the reader will see, effectiveness depends crucially upon control of sequences. For that reason, it has been necessary to develop the steps of the program in sufficient detail to establish the important sequential structure of each step. Presentation should follow whatever mode is most comfortable for the instructor, but if he compromises the sequences, he shall no longer be practicing what he preaches.

Introduction

Leadership Objectives

The following are presented as specific objectives for instructional leaders:

1. Open, Active Learning Process

   The training program should provide an adequate knowledge base for effective understanding of techniques. However, the emphasis of instruction should be upon active involvement of the participants in learning, testing and refining both cognitive and affective skills.

2. Human Relations Skills

   The training program should systematically promote:

   a. An open trust relationship between participants and leaders

   b. An open trust relationship between participants

   c. The opportunity for participants to identify as effective members of both large and small group activities

3. Skill in Processes

   The training program should systematically and sequentially develop skills in each of the thinking processes through:

   a. Simulation activities

   b. Laboratory activities

   c. Application activities

4. Curriculum Development

   The training program should systematically and sequentially develop understanding of and skill in:

   a. Identifying and sequencing a structure of knowledge

b. Development and sequencing of learning experiences for meeting multiple objectives

c. Applying thinking processes to a curriculum sequence

5. Self-Evaluation

The training program should provide adequate opportunity for both participants and leaders to engage in systematic and objective self-evaluation.

INSTRUCTIONAL FORMAT

This training program is designed so that it may be utilized in any one of three instructional settings:

1. Workshop: Instruction provided in a manner which immerses participants in an intensive program of involvement, uninterrupted by regular professional responsibilities.
2. Extension Course: Instruction implemented over a period of time (evenings and Saturdays) for participants who are involved in regular, ongoing professional responsibilities.
3. Methods Course: Instruction conducted for students enrolled in a teacher preparation course.

Training Manaul Format

This manual is color coded to identify major kinds of content and to facilitate reference and use. It has been packaged in a free form to allow the trainer to segment the written materials as desired. This does not mean the sequences are interchangeable, merely that the instructor need not carry the entire volume with him at one time.

Yellow: A single yellow page provides a brief overview of the content, materials, rationale and objective as a preface for each section.

Green: All leadership notes designed for only the leader's use in implementing the program are presented on green paper.

White: All materials designed for the participant are presented on white paper. These materials are located in the instructor's manual at the point of their intended use. However, a separate volume, entitled Participant Materials, has been compiled which should be distributed to each of the participants at the beginning of the workshop.

Blue: One handout (pages 475-476) has been included on blue paper and placed at the end of the participant materials. To control access to its information, it should be collected BEFORE the workshop begins. Later, it will be redistributed at the right time to provide a data resource for participant predictions. See the NOTE on page 43.

Instructional Format

Levels of Leadership Competency

This program has been designed to be implemented by instructional leaders with varying levels of background experience and demonstrated competency in the processes.

First Level: Instructors without previous involvement and experience in a higher level thinking abilities instructional program.

This program has been designed so the materials themselves will produce a relatively high level of participant achievement if the instruction is given systematically and sequentially as presented in this manual. Knowledge base presentations, simulation and laboratory experiences are all presented in a form which can be implemented by a first level instructor.

EXCEPTIONS TO THIS ARE THE FOLLOWING SENSITIVITY EXPERIENCES:

- SENSITIVITY TO CONCEPT DIAGNOSIS
- SENSITIVITY TO INTERPRETATION OF DATA, LITERATURE
- SENSITIVITY TO INTERPRETING AN INFORMATION DISPLAY
- SENSITIVITY TO APPLICATION OF KNOWLEDGE

For each of these sensitivity experiences, a leader is required who has developed competency in the process. Since omitting the sensitivity experiences can result in a reduction of the potential achievement of participants, it is urged that first level instructors make every effort to obtain the necessary competency to conduct these activities. Also, it is essential that all first level instructors become thoroughly familiar with the total program prior to initiating instruction. If a leadership training program is not available in the area, the leader is urged to "walk-through" the manual in careful detail. For answers to any questions or concerns the instructor should write to the Director of Dissemination, Northwest Regional Educational Laboratory, 710 S.W. Second Avenue, 500 Lindsay Building, Portland, Oregon 97204.

Second Level: Instructors whose previous experience has been limited to that of a participant in a higher level thinking abilities instructional program.

Instructors who have had a previous experience as a participant in a higher level thinking abilities instructional program will find they will be quite secure and comfortable in using this program. Of course, instructors at this second level of competency will also need to become thoroughly familiar with the materials in advance of initiating instruction, since they will find many exercises that are new. However, in most cases, they should be able to conduct all activities with clear understanding of their intent, and with ease of implementation.

Third Level: Instructors with previous leadership experience in the implementation of a higher level thinking abilities instructional program.

Instructors whose previous experience has included being a participant in an instructional program, testing the processes over an extended period of time in the classroom, and finally instructing others in the processes, will find that this program represents basically an extension and refinement of their previous experiences.

Sample Agendas

The following sample agendas are presented as suggestions for each of the alternate instructional formats. Although each leader will be responsible for designing and producing an agenda that "fits" the particular setting and situation in which the program will be offered, the following have been previously tested and found to be effective.

A significant element which is common to all three instructional formats is:

Participant Grouping

Large Group (LG)	The entire group of participants enrolled in the instructional program.
Small Group (SG)	Unless two or more instructors are working together in the instruction of the program, the class will be handled as a large group even for those activities designated as small groups. Twenty-four participants should be considered maximum for one leader. Ideally, twelve to fifteen participants is considered as an optimum size for small groups.
Subgroup	Groups composed of from three to five members, chosen on the basis of compatibility and the ability to arrange a common meeting time for activities scheduled outside of the instructional setting.

WORKSHOP FORMAT

Sequence	Time	Group	Activity
First Day			
A.M.	30	LG*	Orientation
	30	LG	Rationale for Change
	20	SG**	Reaction to Rationale for Change
	20	SG	Analysis of Group Process
	60	LG	Overview of the Processes
P.M.	20	LG	Rationale for Curriculum Development
	20	SG	Classification of Knowledge
	30	SG	Analysis of Generalizations
	30	SG	Selecting a Structure of Knowledge
	30	SG	Building an Illustrative Model
	20	SG	Directions for Developing an Instructional Unit
Subgroups			Identify a generalization and build an illustrative model to be developed prior to the next session
Second Day			
A.M.	30	SG	Evaluation of Generalizations and Illustrative Models
	60	SG	Sensitivity to Questions
	40	SG	Sensitivity to Concept Diagnosis
	20	SG	Analysis of Process
P.M.	30	LG	Processes in Concept Diagnosis
	30	SG	Opening Questions
	30	SG	Discussion Skills for Listing Process
	30	SG	Discussion Skills for Grouping Process
	20	SG	Discussion Skills for Labeling Process
	20	SG	Directions for Application of Concept Diagnosis to the Instructional Unit
Subgroups			Develop a concept diagnosis task for the instructional unit prior to the next session
Third Day			
A.M.	20	SG	Evaluation of Concept Diagnosis Opening Questions
	30	LG	Demonstration of Concept Diagnosis (Allow adequate time if actual classroom demonstrations are given)

*Large Group
**Small Group

Workshop Format

Sequence	Time	Group	Activity
	20	SG	Reaction to Demonstration
	40	SG	Typescript Analysis of Concept Diagnosis
	20	SG	Discussion of Typescript
	60	SG	Plan Laboratory Experience
P.M.	120		Laboratory Experience in Concept Diagnosis
	30	SG	Reaction to Laboratory Experience
Fourth Day			
A.M.	45	SG	Sensitivity to Interpretation of Data: Literature
	20	SG	Analysis of Process
	15	LG	Processes in Interpretation of Data
	5	SG	Analysis of Typescripts
	20	SG	Interpreting the Typescripts
	20	SG	Analysis of Question Sequences
	20	SG	Scrambled Question Sequence: Literature
P.M.	30	LG	Viewing Film
	15	SG	Interpreting the Film
	45	SG	Constructing Question Sequences
	30	SG	Sharing and Refining Sequences
	15	SG	Assign Laboratory Experience
Subgroups			Plan laboratory experience using either literature or film
Fifth Day			
A.M.	60		Interpretation of Data Laboratory Experience
	30	SG	Reaction to Laboratory Experience
	15	LG	Processes with Learning Experiences
	30	SG	Selecting Learning Experiences
	30	SG	Programing Learning Experiences
P.M.	15	SG	Directions for Selecting and Programing Learning Experiences for the Instructional Unit
	90	SG	Organizing an Information Display
	30	SG	Sensitivity to Interpreting an Information Display
	20	SG	Analysis of Process
Subgroups			Begin process of selecting and programing learning experiences for instructional unit

Workshop Format

Sequence	Time	Group	Activity
Sixth Day			
A.M.	10	LG	Processes in Interpreting An Information Display
	15	SG	Restricting Words
	20	SG	Two Colonies of People
	20	SG	Scrambled Question Sequence
	30	SG	Pursuing an Individual Response
	20	SG	Evaluating Generalizations
	15	SG	Directions for Constructing a Sample Information Display and an Interpretation Question Sequence for Instructional Unit
P.M.	15	SG	Predemonstration Discussion
	30	LG	Demonstration of Interpreting an Information Display
	30	SG	Reaction to Demonstration
	15	SG	Assign Laboratory Experience
	60	SG	Plan Laboratory Experience
Subgroups			Construct a sample information display and an interpretation question sequence for the instructional unit
			Plan for laboratory experience
Seventh Day			
A.M.	120		Interpreting An Information Display Laboratory Experience
	30	SG	Reaction to Laboratory Experience
	30	SG	Evaluation of Information Displays and Question Sequences
P.M.			Work in subgroups on the construction of instructional unit
Eighth Day			
A.M.	40	SG	Sensitivity to Application of Knowledge
	20	SG	Analysis of Process
	30	LG	Processes in Application of Knowledge
	30	SG	Analysis of Opening Questions
	30	SG	Discussion Techniques
P.M.	15	SG	Predemonstration Discussion
	30	LG	Demonstration of Application of Knowledge
	30	SG	Reaction to Demonstration
	15	SG	Directions for Constructing an Application of Knowledge Task for the Instructional Unit

Workshop Format

Sequence	Time	Group	Activity
	15	SG	Assign Laboratory Experience
Subgroups			Plan laboratory experience and complete instructional units
Ninth Day			
A.M.	120		Application of Knowledge Laboratory Experience
	30	SG	Reaction to Laboratory Experience
P.M.	60	SG	Review of the Processes

METHODS COURSE FORMAT

(Twelve or fourteen 2-1/2 hour sessions)

Sequence	Time	Group	Activity
1.	30	LG*	Orientation
	30	LG	Rationale for Change
	20	SG**	Reaction to Rationale for Change
	20	SG	Analysis of Group Process
	60	LG	Overview of the Processes
2.	20	LG	Rationale for Curriculum Development
	20	SG	Classification of Knowledge
	30	SG	Analysis of Generalizations
	30	SG	Selecting a Structure of Knowledge
	30	SG	Building an Illustrative Model
	20	SG	Directions for Developing an Instructional Unit (The unit should be developed for the grade level in which microteaching will be conducted)
Subgroups			Identify a generalization and build an illustrative model to be developed prior to the next session
3.	30	SG	Evaluation of Generalizations and Illustrative Models
	60	SG	Sensitivity to Questions
	45	SG	Sensitivity to Concept Diagnosis
	15	SG	Analysis of Process
4.	30	LG	Processes in Concept Diagnosis
	30	SG	Discussion Skills for Opening Questions
	30	SG	Discussion Skills for Listing Process
	30	SG	Discussion Skills for Grouping Process
	20	SG	Discussion Skills for Labeling Process
	10	SG	Directions for Application of Concept Diagnosis to the Instructional Unit
Subgroups			Develop a concept diagnosis task for the instructional unit prior to the next session
5.	20	SG	Evaluation of Concept Diagnosis Opening Questions
	45	LG	Demonstration of Concept Diagnosis
	15	SG	Reaction to Demonstration
	30	SG	Typescript Analysis of Concept Diagnosis

*Large Group
**Small Group

Methods Course Format

Sequence	Time	Group	Activity
	20	SG	Discussion of Typescript
	20	SG	Assign Laboratory Experience in Concept Diagnosis
Subgroups			Plan laboratory experience in concept diagnosis
6.	60		Laboratory Experience in Concept Diagnosis
	30	SG	Reaction to Laboratory Experience
	45	SG	Sensitivity to Interpretation of Data: Literature
	15	SG	Analysis of Process
7.	15	LG	Processes in Interpretation of Data
	5	SG	Analysis of Typescripts
	20	SG	Interpreting the Typescripts
	20	SG	Analysis of Question Sequences
	15	SG	Scrambled Question Sequence: Literature
	30	SG	Viewing Film
	15	SG	Interpreting the Film
	20	SG	Constructing Question Sequences
	20	SG	Sharing and Refining Sequences
	10	SG	Assign Laboratory Experience using either Literature or Film
Subgroups			Plan laboratory experience for interpretation of data using either literature or film
8.	60		Interpretation of Data Laboratory Experience
	30	SG	Reaction to Laboratory Experience
	15	LG	Processes with Learning Experiences
	20	SG	Give Directions for practicum groups to work on exercises, "Selecting Learning Experiences" and "Programing Learning Experiences"
Subgroups			Work on exercises on selecting and programing learning experiences
9.	30	SG	Complete Exercises on Selecting and Programing Learning Experiences
	15	SG	Directions for Selecting and Programing Learning Experiences for Instructional Units
	60	SG	Organizing an Information Display
	30	SG	Sensitivity to Interpreting An Information Display
	15	SG	Analysis of Process

Methods Course Format

Sequence	Time	Group	Activity
Subgroups			Begin process of selecting and programing learning experiences for instructional units
10.	30	SG	Evaluation of Selecting and Programing of Learning Experiences
	10	LG	Processes in Interpretation of Data: Information Display
	20	SG	Restricting Words
	20	SG	Two Colonies of People
	20	SG	Scrambled Question Sequence
	20	SG	Pursuing an Individual Response
	20	SG	Evaluating Generalizations
	10	SG	Directions for Constructing a Sample Information Display and Interpretation Question Sequence for Instructional Unit
Subgroups			Construct a sample information display and interpretation question sequence for the instructional unit
11.	30	SG	Evaluation of Sample Information Displays and Interpretation Question Sequences
	15	SG	Predemonstration Discussion
	30	LG	Demonstration of Interpretation of Data: Information Display
	30	SG	Reaction to Demonstration
	45	SG	Assign and Plan Laboratory Experience on Interpreting An Information Display
Subgroups			Plan laboratory experience on interpreting an information display
12.	60		Interpreting An Information Display Laboratory Experience
	30	SG	Reaction to Laboratory Experience

It is suggested that this point represents a natural break in the instructional program. It would be unfortunate not to provide students enrolled in teacher preparation programs experiences with the process, "Application of Knowledge." However, if, because of limitations in time, it is necessary to limit the instructional program, it is suggested that students complete their units at this point by selecting and programing learning experiences and culminating the unit with an appropriate expression activity.

Methods Course Format

Sequence	Time	Format	Activity
	45	SG	Sensitivity to Application of Knowledge
	15	SG	Analysis of Process
13.	30	LG	Processes in Application of Knowledge
	30	SG	Opening Questions
	20	SG	Discussion Techniques
	15	SG	Predemonstration Discussion
	30	LG	Demonstration of Application of Knowledge
	10	SG	Directions for Developing an Application of Knowledge Task for Instructional Unit
	10	SG	Assign Laboratory Experience for Application of Knowledge
Subgroups			Plan laboratory experience, complete instructional units
14.	60		Application of Knowledge Laboratory Experience
	30	SG	Reaction to Laboratory Experience
	60	SG	Review of the Processes

EXTENSION COURSE FORMAT

(Fourteen 2-1/2 hour sessions)

Sequence	Time	Group	Activity
1.	30	LG*	Orientation
	30	LG	Rationale for Change
	20	SG**	Reaction to Rationale for Change
	20	SG	Analysis of Group Process
	60	LG	Overview of the Processes
2.	20	LG	Rationale for Curriculum Development
	20	SG	Classification of Knowledge
	30	SG	Analysis of Generalizations
	30	SG	Selecting a Structure of Knowledge
	30	SG	Building an Illustrative Model
	20	SG	Directions for Developing an Instructional Unit
Subgroups			Identify a generalization and build an illustrative model to be developed prior to the next session
3.	30	SG	Evaluation of Generalizations and Illustrative Models
	60	SG	Sensitivity to Questions
	45	SG	Sensitivity to Concept Diagnosis
	15	SG	Analysis of Process
4.	30	LG	Processes in Concept Diagnosis
	30	SG	Opening Questions
	30	SG	Discussion Skills for Listing Process
	30	SG	Discussion Skills for Grouping Process
	20	SG	Discussion Skills for Labeling Process
	15	SG	Directions for Application of Concept Diagnosis to the Instructional Unit
Subgroups			Develop a concept diagnosis task for the instructional unit prior to the next session
5.	20	SG	Evaluation of Concept Diagnosis Opening Questions
	30	LG	Demonstration of Concept Diagnosis
	20	SG	Reaction to Demonstration
	40	SG	Typescript Analysis of Concept Diagnosis
	20	SG	Discussion of Typescript
	15	SG	Assign Laboratory Experience
Subgroups			Plan and conduct laboratory experience in concept diagnosis

*Large Group
**Small Group

Extension Course Format

Sequence	Time	Group	Activity
6.	30	SG	Reaction to Laboratory Experience
	45	SG	Sensitivity to Interpretation of Data: Literature
	15	SG	Analysis of Process
	15	LG	Processes in Interpretation of Data
	5	SG	Analysis of Typescripts
	20	SG	Interpreting the Typescripts
	20	SG	Analysis of Question Sequences
	15	SG	Scrambled Question Sequence: Literature
	5	SG	Assign Laboratory Experience: Literature
Subgroups			Plan and conduct laboratory experience: literature
7.	30	SG	Reaction to Laboratory Experience
	30	LG	Viewing Film
	15	SG	Interpreting the Film
	30	SG	Constructing Question Sequences
	30	SG	Sharing and Refining Sequences
	5	SG	Assign Laboratory Experience: Films
Subgroups			Plan and conduct laboratory experience: films
8.	30	SG	Reaction to Laboratory Experience
	15	LG	Processes with Learning Experiences
	30	SG	Selecting Learning Experiences
	30	SG	Programing Learning Experiences
	15	SG	Directions for Selecting and Programing Learning Experiences for Instructional Unit
Subgroups			Begin process of selecting and programing learning experiences for instructional unit
9.	30	SG	Evaluating Selecting and Programing of Learning Experiences
	60	SG	Organizing an Information Display
	40	SG	Sensitivity to Interpreting An Information Display
	20	SG	Analysis of Process
10.	10	LG	Processes in Interpreting an Information Display
	20	SG	Restricting Words
	20	SG	Two Colonies of People
	20	SG	Scrambled Question Sequence
	30	SG	Pursuing an Individual Response
	20	SG	Evaluating Generalizations

Extension Course Format

Sequence	Time	Group	Activity
	15	SG	Directions for Constructing a Sample Information Display and an Interpretation Question Sequence for Instructional Unit
Subgroups			Construct a sample information display and an interpretation question sequence for the instructional unit
11.	45	SG	Evaluation of Sample Information Displays and Interpretation Question Sequences
	15	SG	Predemonstration Sequences
	30	LG	Demonstration of Interpreting An Information Display
	30	SG	Reaction to Demonstration
	30	SG	Assign and Plan Laboratory Experience
Subgroups			Plan and conduct laboratory experience in interpretation of data: information display
12.	30	SG	Reaction to Laboratory Experience
	45	SG	Sensitivity to Application of Knowledge
	20	SG	Analysis of Process
	30	LG	Processes in Application of Knowledge
	30	SG	Opening Questions
13.	30	SG	Discussion Techniques
	15	SG	Predemonstration Discussion
	30	LG	Demonstration of Application of Knowledge
	30	SG	Reaction to Demonstration
	15	SG	Directions for Constructing an Application of Knowledge Task for Instructional Unit
	15	SG	Assign Laboratory Experience
Subgroups			Plan and conduct laboratory experience in application of knowledge, complete instructional unit
14.	30	SG	Reaction to Laboratory Experience
	60	SG	Review of the Processes

PREINSTRUCTIONAL ARRANGEMENTS

Content: Preinstructional planning and arrangements are presented in relation to laboratory experiences, physical facilities, duplication of materials, communication with participants.

Leadership Materials: Preinstructional Arrangements, Leadership Notes

Laboratory Experiences

Participant's Sample Letter

Cooperating Teacher's Sample Letter

Rationale: In order to insure smooth and effective instructional procedure, a number of arrangements must be made well in advance of the workshop

Objective: Following communication with district administrators and workshop leaders, but well in advance of the designated teaching dates, the program will be implemented with the following demonstrated qualities:

1. Adequate quantity and appropriate grade levels of classrooms will be available for laboratory experiences

2. Adequate facilities will be available

3. Appropriate instructional and audiovisual materials will be available when needed

4. Leaders will understand their role and function

5. Participants will be welcomed to the workshop

PREINSTRUCTIONAL ARRANGEMENTS

I. Communicate with the administrators in charge early enough in advance to insure they understand the format, and to provide adequate time to arrange for needed facilities and materials.

A. Laboratory Experience

Be very specific concerning the laboratory experience. The administrator needs to be well aware of the demands this activity will place upon his teachers and school administration. Also, a sincere effort should be made to guarantee that participants receive a smoothly organized, effective laboratory experience. (For details, see Laboratory Experiences, pages 29-34.

B. Physical Facilities

Arrange for facilities which include:

Large and small group meeting areas
Blackboards in each area
Preferably tables and chairs in each area
Preferably areas where smoking is permitted
Complete coffee facilities
Easy access to lunch facilities

C. Participant Materials

Make certain sufficient copies of the manual, Participant Materials, are available and accessible for the first workshop session.

D. Instructional Materials

Arrange to have available any needed instructional materials, such as:

Writing paper
Butcher paper or chart paper
Flow pens
Name tag cards
Name signboard cards (5x7)

II. Communicate with, or preferably meet with, all instructional leaders early enough in advance of the workshop to insure their feeling comfortable with the format, materials, roles and functions.

III. If possible, obtain a list of participants in advance along with participant data. Divide into the small groups if there is more than one leader. It is suggested these groups be heterogeneous in nature, including participants representing all levels, disciplines and backgrounds, except as indicated for specific activities. (Grouping can also be accomplished quite easily on the first day.)

IV. It is helpful to write participants in advance, welcoming them to the program. A sample letter is presented on page 35.

NOTE: If possible, ask participants to tape record a classroom lesson in advance of the instructional program and bring the tape to the opening session. This not only creates preinstruction involvement and commitment to the program, but the tape can be used very effectively in the learning sequence, Sensitivity to Questions. If a tape is requested, it is suggested the following instructions for taping be sent to each participant well in advance of the opening sessions.

Preinstructional Arrangements

Directions for Audio Taping

1. Tape record a classroom discussion in which you, as the teacher, and students are engaged in verbal interaction.

2. The content of the discussion can be any area of the curriculum, and focused on any topic. However, it should include both your comments and the students engaged in verbal interaction. Possible content to discuss could be:

    A film

    A story

    A science experiment

    Researched information

    A playground or school problem

    A contemporary social issue

    Anything that might elicit active verbal interaction

3. The discussion should be approximately 10-15 minutes in duration.

4. For best recording results, it is suggested the discussion be conducted with a group of approximately twelve to fifteen students seated in a semicircle in close proximity to the tape recorder.

5. Indicate on the tape:

    Name

    School

    Grade level

    Number of children

    Subject content of discussion

6. Please bring the tape and the recorder with you to the first session.

LABORATORY EXPERIENCES

The Laboratory Experience is an anxiety-provoking experience for most participants. However, it has been found to be the one most significant factor in changing teaching behavior. Therefore, it is considered an essential element of the program. Effective preinstructional planning will guarantee, to a large degree, a successful teaching experience for all participants.

Below are suggested procedures for implementing the laboratory experience:

I. Workshop
II. Extension Course
III. Methods Course

I. Workshop Format

A. In order to provide a successful laboratory experience for each participant within a workshop format, the following arrangements should be made well in advance.
   1. Identify the grade-level teaching preference of each participant.
   2. Organize participants in pairs (one to teach, one to observe) for their laboratory experience. Pair teachers with teachers, administrators with administrators. Use the best judgment possible in matching individuals with attention to common interests and compatibility.
   3. Confer with local school administrators in charge and arrange for the number and level of classrooms

needed. Be very specific about numbers, time, level and location. Attempt to work within their schedule, giving attention to PE and other "pupil-worshiped" curriculum areas. Make every effort to provide each participant with a natural classroom situation. (Late afternoon is not a time to expect active pupil participation.)

4. Send letter to cooperating teachers. A sample letter is provided on page 36.

II. Extension Course Format

A. The laboratory experience within the extension course is conducted in each participant's instructional setting. In other words, a classroom teacher will conduct the laboratory experience in his own classroom--but he will be required to teach.

Therefore, participants should be encouraged (required, if possible) to register for an extension course in pairs of at least two teachers to a building.

B. In advance of the first laboratory experience, organize participants into pairs, teacher with teacher, administrator with administrator. Determine those situations in which teachers may have difficulty being released from teaching duties in order to observe their laboratory experience partner. Confer with building administrators in such situations to develop procedures for successful implementation.

Laboratory Experiences

III. Methods Course Format

A. In a related methods seminar which accompanies a laboratory teaching experience, follow the above directions for extension course.

B. If the course is the traditional "Do-As-I-Say-And-Not-As-I-Do-Methods-Class," the format must permit at least a modified laboratory experience if the skills are to be even partially developed. There is a great deal of evidence to indicate that just "telling" teachers how to teach is almost a total waste of time and effort. Consequently, it is strongly urged that the following suggestions be utilized.

1. Divide class participants into teams of three members per team. Each of these three-member teams will plan together, teach together and critique each other's teaching. Use the best possible judgment in organizing each group.
2. Following appropriate channels (college administrator, central office administration, building principal), visit the local school district or laboratory school and obtain at least two classrooms of children which may be utilized for a total of three hours during the calendar period of the methods course.
3. Confer with the teachers of the classrooms and arrange to have pupils divided into the appropriate number of pupil groups to provide for five to eight children for each of the participant groups.

4. Make arrangements for the following:

   a. Select a specific date and a particular hour which are mutually convenient for the classroom teachers and you.

   b. Assign a team to each of the small pupil groups. Arrange for room locations (the hall will do) and blackboards.

   c. Each of the teams should have carefully planned together for a specific cognitive process teaching strategy.

      (If it can be arranged so that the teams plan with the classroom teachers to develop strategies which fit the ongoing curriculum, it would be most desirable. However, it must be recognized that this is not always possible.)

   d. One of the team teaches, the other two observe and record data of the events of the lesson, using the appropriate Observation Guide.

   e. Arrangements need to be made for returning on two more occasions, at which time the team member role and functions will rotate so that each member teaches one of the cognitive processes and observes the other two.

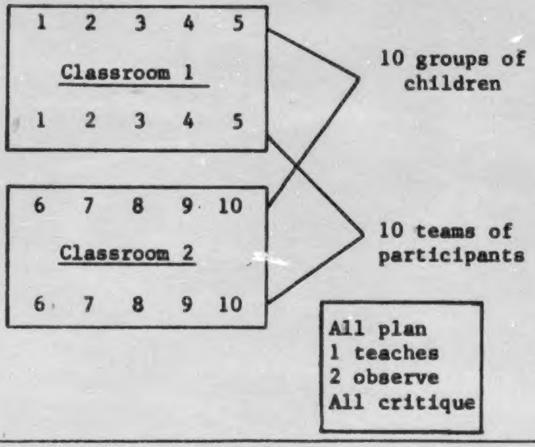
      Adding two additional classrooms and staggering the days provides for two teaching experiences for each participant.

Laboratory Experiences

Adding four classrooms and staggering the days provides for a teaching experience in each of the cognitive processes for each of the participants.

The general format for microteaching, illustrated on the next page, shows these arrangements.

GENERAL FORMAT - MICROTEACHING

Number of experiences in teaching for each participant	Concept Diagnosis	Interpretation of Data	Application of Knowledge
Model 1: 2 Classrooms	 1 2 3 4 5 Classroom 1 1 2 3 4 5 6 7 8 9 10 Classroom 2 6 7 8 9 10 10 groups of children 10 teams of participants All plan 1 teaches 2 observe All critique	Repeat and Rotate Roles*	Repeat and Rotate Roles*
Model 2: 4 Classrooms Twice	**Second Day** Classroom 3 Classroom 4		
Model 3: 6 Classrooms Each participant teaches each of the cognitive processes	**Third Day** Classroom 5 Classroom 6	*NOTE: This format allows each participant to teach one of the three processes and observe the other two.	

45

PARTICIPANT'S SAMPLE LETTER

Dear :

I would like to take this opportunity to welcome you as a participant to the instructional program, Development of Higher Level Thinking Abilities, which will be conducted at ________________________________ beginning ________________________________.

The program follows a format that is specifically designed to insure that each participant gains an understanding of, and skill in, teaching strategies proven to develop the thinking abilities of children and strengthen the instructional power of teachers. I am sure that you will find this an exciting and valuable professional experience.

We will convene at ____(time)____ in ______(building)______ at ______(location)__________. I shall look forward with pleasure to the opportunity to meet you personally.

Sincerely,

COOPERATING TEACHER'S SAMPLE LETTER

Dear :

I would like to take this opportunity to express my sincere appreciation for your willingness to allow us to utilize your class during our workshop.

The workshop is purposely designed to give each participant a laboratory experience in teaching each of the processes which constitute the curriculum. Evaluation has indicated this is a most valuable experience in learning. It is the experience that translates theory into practice.

It would be most helpful if you did not prepare the class in advance, other than to indicate that they will be having a visiting teacher on that day. A natural situation is most important for the success of the experience.

Again, I would like to express my thanks for your cooperation.

Sincerely,

ORIENTATION

Content:	Large group presentation opens the program, followed by introductions, facilities, agenda, evaluation procedures. Obtaining participant data and small group assignments.
Leadership Materials:	Orientation, Leadership Notes
Participant Materials:	Content Summary Instructional Objectives Instructional Model Instructional Themes Agenda* Postsession Reaction Form
Rationale:	To provide participants with an understanding of instructional content and format
Objective:	Following a 20-40 minute presentation, participants will demonstrate an intellectual understanding of training leaders' roles, identities and the facilities to be used. They will demonstrate a limited understanding and tentative acceptance of the instructional objectives, evaluation procedures and format of the training program. Acceptable behavior at this point will be demonstrated by a willingness of participants to engage in conversation with both leaders and other participants concerning format and process.

*NOTE: An agenda, of course, must be MADE UP for each particular course or workshop by the training leader. Sample agendas for each format may be found on pages 14-24.

Most participants will have some degree of apprehension concerning what will be expected of them in the instructional program. The orientation session is designed to provide them with a limited understanding of both content and format.

Sequence	Time	Group	Activity
A	5	LG	Introduction 1. Introduce the individuals who have played, or will play, a significant role in the organization of the instructional program: Leaders Administrators
B	5	LG	Facilities 1. Give a quick overview of facilities and rules: Rest rooms Arrangements for meals Arrangements for coffee Meeting rooms Ground rules for smoking
C	10	LG	Workshop Objectives 1. Refer to Content Summary in the participant materials. Review its content.

Orientation

Sequence	Time	Group	Activity
			2. Refer to Instructional Objectives. If you wish, briefly elaborate on each of the objectives.
D	10	LG	Instructional Model 1. Refer to the Instructional Model. Elaborate on the instructional procedures which will be utilized in the workshop. Emphasize that the most important component of the instructional program is the laboratory experience; it may seem anxiety provoking at this time, but all previous participants have indicated it is the most valuable.
E	10	LG	Instructional Themes 1. Refer to Instructional Themes. Indicate there are two strands that run through the instruction. One deals with curriculum development, the other with teaching strategy as applied to the curriculum.
F	5	LG	Agenda 1. DISTRIBUTE and review the agenda which will be followed. (Samples on pages 14-24 will help you develop the agenda most suitable for the format being used.)

Orientation

Sequence	Time	Group	Activity
G	5	LG	Evaluation Procedures

1. Discuss the procedure to be followed for both the evaluation of:
   a. Participant achievement
   b. Instructional program

Evaluation should be considered a significant aspect of the program. During orientation, attention should be drawn to evaluation procedures for self-evaluation by participants and feedback to the leaders relative to workshop content and processes. Some suggestions for such procedures are listed below.

Daily Evaluation:

The Postsession Reaction Form is provided as an instrument to be used for self-evaluation, daily feedback to leaders, or both.

Friday Fish Fry:

An effective method for providing periodic feedback to the instructional leaders has been to:

1. Divide participants into small leaderless groups

Orientation

Sequence	Time	Group	Activity
			2. Ask each group to appoint a recorder 3. Discuss content and processes of the program 4. Provide feedback to the leaders by having recorders meet with leaders or by anonymous written statements Grades: If the instructional program is being provided for college credit, it is suggested that grading represents a significant barrier to active learning. Effort should be made to reduce this barrier to the extent possible.
H	5	LG	Small Group Assignments 1. Make assignment of participants to small groups. (See Preinstructional Arrangements.) 2. If background information on the participants is not available, proceed to the next step and make assignments at the next immediate opportunity. (Participants will be most anxious to know with whom they will work.)

Orientation

Sequence	Time	Group	Activity
I	10	LG	Name Cards and Participant Data 1. Ask each participant to make a signboard (5x7) emphasizing his first name and to use it until leaders and participants have learned his name. (From this point on, attempt to promote an active, open relationship among participants and between participants and leaders. A formal atmosphere will restrict active involvement and, consequently, restrict learning.) 2. Obtain participant data, if not previously available. Name School Grade Level and/or Subject Area Position Preferred Grade Level for Laboratory Experience
J		LG	Registration 1. If training program is being presented for college credit, provide necessary time for registration procedures.

Sequence	Time	Group	Activity
K			Organization of Small Subgroups Following the orientation session, analyze the participant data obtained, and tentatively organize participants into the small subgroups. The important factor to consider is that these groups must work together outside of this instructional setting as an instructional unit. Announce these assignments at the next available opportunity and indicate that participants may rearrange the membership if they so desire.
L			NOTE: Ask participants to remove the blue sheet, A Fact Sheet on Iraq, from their materials and pass it to the instructor. Announce that it will be returned to them for use during the proper exercise.

CONTENT SUMMARY

Rationale

As a result of the explosion of knowledge occurring in every subject, and the extremely rapid rate of social and technological change, it has been demonstrated clearly that the learning process must be expanded beyond the traditional approach of memorizing facts. In every major curriculum development project being conducted today, great emphasis is being placed on the development of the processes of thinking. Unfortunately, most teachers at all levels of education are ill-prepared to function effectively in response to this new emphasis.

Research Base

The content of the higher level thinking abilities program has developed from the research project of Dr. Hilda Taba at San Francisco State College under a cooperative research grant of the U.S. Office of Education. In process for over ten years, the research program has involved several thousand children, public school teachers and the services of nationally-recognized authorities in educational psychology and the subject matter disciplines.

Overview of Content

Briefly and basically, participants acquire the theoretical understanding and practical skill to implement teaching strategies which result in pupils developing the ability to:

1. Systematically formulate concepts
2. Acquire, organize and synthesize large quantities of factual information
3. Perceive relationships and formulate generalizations and principles which can be logically supported by facts
4. Apply knowledge to new situations

Content Summary

Instructional Format

The content of the instructional program is presented through its procedures: presentation, simulation and laboratory experience.

1. Factual information is presented through lectures and/or readings.
2. Understanding and skills are obtained through the inductive processes of analyzing and interpreting data.
3. Accommodation to one's own teaching style and behavior is acquired by practicing strategies under observation.

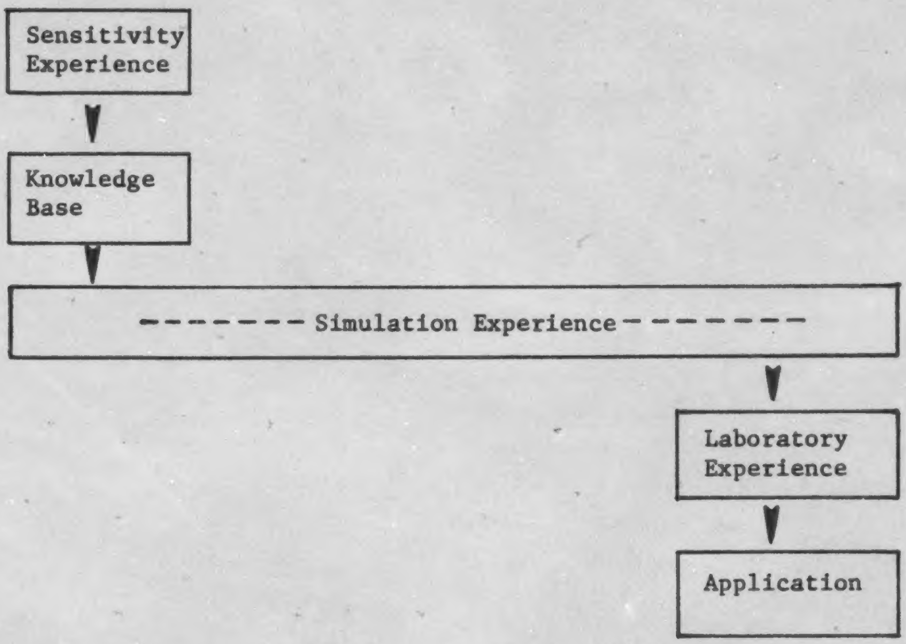
INSTRUCTIONAL OBJECTIVES

As a result of involvement in the higher level thinking abilities training program, participants will evidence the following behavior:

1. Understanding of and skill in using the thinking processes of:
    a. Concept Diagnosis
    b. Interpretation of Data
    c. Application of Knowledge
2. Understanding of and skill in the processes of analyzing a body of knowledge for its structure and applying the above processes.
3. Understanding of and skill in the processes of programing an instructional unit which systematically develops the thinking abilities of students.

INSTRUCTIONAL MODEL

The following represents a schematic model of the instruction provided in the training program, "Development of Higher Level Thinking Abilities." Instruction is presented through a series of rotations through the following steps:



Sensitivity Experiences

Each thinking process is introduced through an activity designed to engage participants in immediate involvement. Typically, the sensitivity experience includes role playing in which participants, though they do not "pretend" to be pupils, involve themselves in using the process as pupils would in the classroom.

Knowledge Base

Initial involvement is followed by a didactic presentation on theory and techniques.

Instructional Model

Simulation Experiences

Each process is broken down into its component parts and simulated; that is, participants use the behavior that characterizes the process in studying it. Learning takes place through active dialogue between participants when confronted with a problem situation.

Laboratory Experiences

Each participant teaches the process in a classroom at the appropriate grade level. During this teaching experience, he is under observation with systematic data collection and feedback on his behavior.

Application

Each participant is asked to program an instructional sequence which utilizes the processes presented in his chosen curriculum area.

INSTRUCTIONAL THEMES

Higher Level Thinking Abilities
Training Program

The following themes operate as parallel threads of instruction throughout the training program, "Higher Level Thinking Abilities." This parallel design has been developed to illustrate, as well as instruct, how a structure of process can be related to a structure of knowledge.

Knowledge Curriculum Development	Process Teaching Strategies
(1) A Rationale For Curriculum Development Exercises in selecting and organizing a structure of knowledge	
Application of the process of Concept Diagnosis to an instructionl sequence	(1) Process of Concept Diagnosis Sensitivity Experience Knowledge Base Presentation Simulation Exercises Demonstration Laboratory Experience
(2) Processes with Learning Experiences Exercises in selecting and programing learning experiences	
Application of the process of Interpretation of data to an instructional sequence	(2) Process of Interpretation of Data Exercises in the interpretation processes relative to literature, films, and information displays Sensitivity Experience Knowledge Base Presentation Simulation Exercises Demonstration Laboratory Experience
Application of the process of Application of Knowledge to an instructional sequence	(3) Process of Application of Knowledge Sensitivity Experience Knowledge Base Presentation Simulation Exercises Demonstration Laboratory Experience

---

In order to illustrate very specifically how a structure of process can be related to a structure of knowledge, a model curriculum sequence operates as an instructional sample throughout the training program. A social studies unit which compares and contrasts Japan and India has been chosen for this purpose. All sensitivity experiences, curriculum development activities and knowledge base presentations are related to this sample. Applications to other curriculum areas and instructional levels are made from this exemplary framework.

POSTSESSION REACTION FORM

Course ______________________

Title ______________________ Name __________________

Location ______________________ Date __________________

1. How productive has this session been for you personally?

   Not Very Productive ☐ ☐ ☐ ☐ ☐ ☐ Extremely Productive

   What contributed to productivity for you?

   What hindered productivity for you?

2. How clear were you about what you were supposed to be doing and why you were doing it during this session?

   Very Confused ☐ ☐ ☐ ☐ ☐ ☐ Very Clear

   What, in particular, did you find confusing or unclear?

3. All in all, how well was your group working during this session?

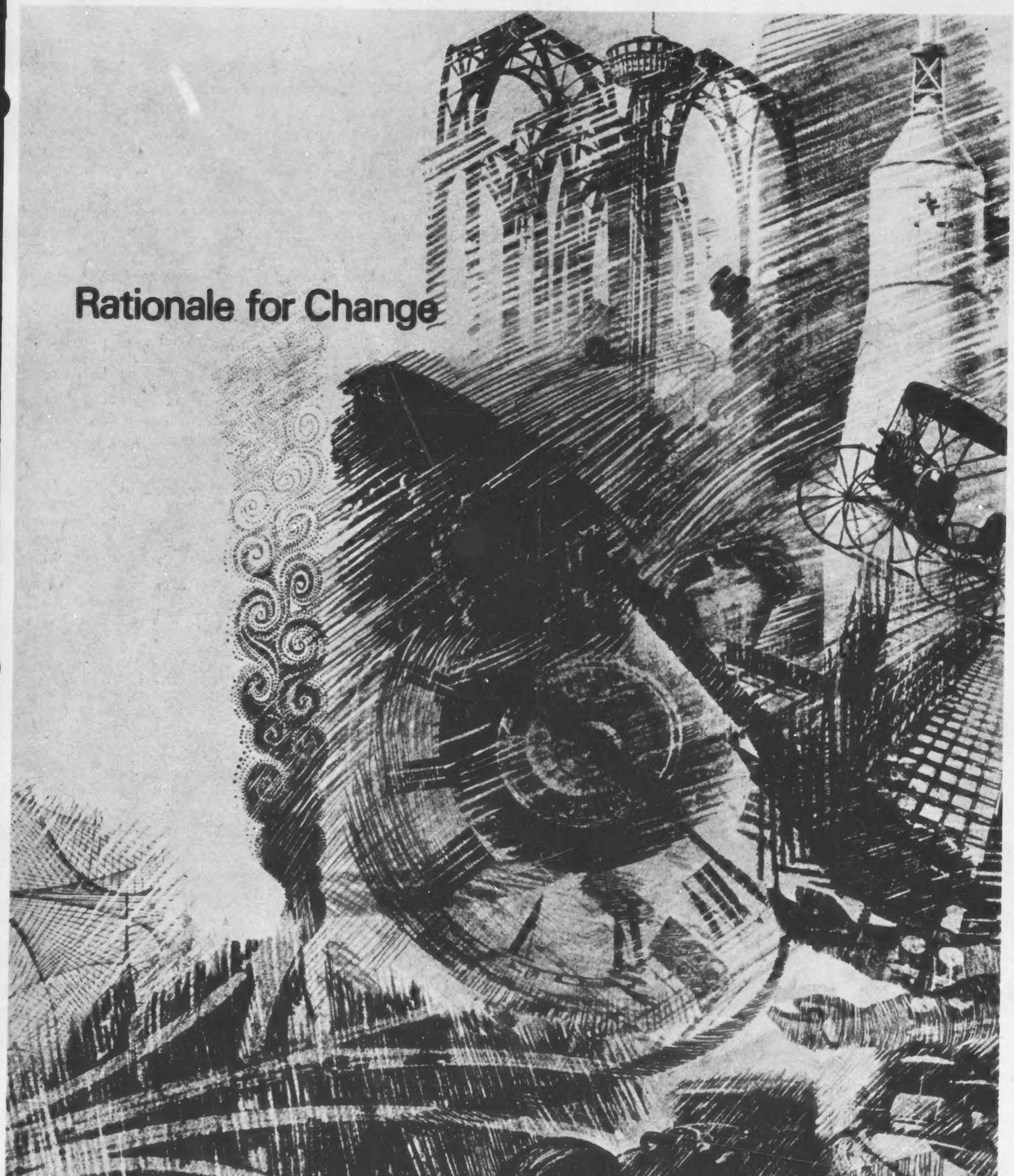
   We seemed to be hung up, stymied ☐ ☐ ☐ ☐ ☐ ☐ We worked very smoothly, effectively

   What seemed to help your group in its work?

   What seemed to hinder your group?

4. Additional comments and feedback

Rationale for Change



RATIONALE FOR CHANGE

Content:	This small group involvement activity is designed as a sensitivity experience. Participants read The Rationale For Change and interact to predict the implications for the teaching process. The activity ends by discussing group processes.
Leadership Materials:	Rationale For Change, Leadership Notes
Participant Materials:	The Rationale For Change Data Retrieval Chart (Alternative Experience) Reaction to The Rationale For Change Five Dimensions of Group Growth
Rationale:	To sensitize participants to the basis for curriculum innovations To sensitize participants to group process To provide opportunity for group interaction and developing group relationships
Objective:	Following this sensitivity experience, participants will demonstrate (a) an understanding of the need to seek additional teaching alternatives by participating actively in subsequent workshop activities, and (b) an initial understanding of group processes by participating actively in subsequent discussions.

This activity is designed to sensitize participants to the basis for the rapid change that is taking place in modern curriculum development.

Sequence	Time	Group	Activity
A	30	LG	Reading of The Rationale For Change 1. Direct the participants to read The Rationale For Change. 2. Following the reading, divide into small groups.
B	30	SG	Reaction to Reading 1. Refer to the exercise, Reaction to The Rationale For Change. 2. Divide each small group into subgroups of three or four participants. Ask them to react to the quotations indicated and to be prepared to share their reactions with the total group. 3. After approximately 20 minutes, reconvene small groups and share reactions. 4. After approximately 10 minutes of sharing, ask, "What implications do you see for the teaching process right now?" Stress or, if necessary, point out the three elements listed on the following pages.

Rationale for Change

Sequence	Time	Group	Activity
			Emphasis on structure of knowledge Emphasis on process Emphasis on human relations skills 5. Close by indicating that the workshop will focus on techniques for dealing with structure of knowledge and process.
C	20	SG	**Analysis of Group Process** 1. Indicate that the workshop will provide opportunities for participants to operate in various sized groups. 2. Divide into small groups again. Ask participants to recall and list those factors which either help or hinder group productivity. 3. After approximately 15 minutes, reconvene to the total group and chart reactions on board.

Helps	Hindrances

Rationale for Change

Sequence	Time	Group	Activity
			4. Refer to Five Dimensions of Group Growth and ask participants to read it at their earliest convenience.

This activity is designed as an alternate experience to sensitize participants to the basis for the rapid change that is taking place in modern curriculum development. Although it does not have the emotional impact of the paper, The Rationale For Change, it does involve the participants immediately in active dialogue relative to the need for change.

Sequence	Time	Group	Activity
A	60	SG	Building a Data-Retrieval Chart 1. Refer to the data-retrieval chart entitled, The Rationale For Change, page 72. 2. Ask participants to work as individuals for a few minutes and to write down their reactions to each social force in relation to Column 1 (What is it?) and Column 2 (How does it affect society?) 3. When most participants have made comments in both columns, organize into subgroups of from three to five. Ask them to share and to add to their information. 4. When it seems that both Columns 1 and 2 have been fairly well discussed, ask participants to

Sequence	Time	Group	Activity
			react in their subgroups to Column 3. (What are the implications for education?) 5. When participants have completed reacting to Column 3, ask them to join the total group and share what they have discussed. 6. Ask: Which of these do you feel either you or your district is attempting to do? In what way? Can you summarize the general focus of the implications we have discussed? 7. Point out this workshop is designed to illustrate alternatives in teaching strategy which have proven to be effective in the improvement of children's thinking ability.
B	20	SG	Analyzing Group Process 1. Indicate the workshop will provide opportunities for participants to operate in various sized groups. 2. Divide into small groups again and ask them to recall and list those factors which either help or hinder group productivity.

Rationale for Change
Alternative Experience

Sequence	Time	Group	Activity
			3. After approximately 15 minutes, reconvene small group and chart reactions on board.

Helps	Hindrances

Sequence	Time	Group	Activity
			4. Refer to Five Dimensions of Group Growth, and ask participants to read it at their earliest convenience.

THE RATIONALE FOR CHANGE

Most of us in the field of education today are somewhat confused, possibly frustrated, and, in some respect, a bit frightened. Those of us who taught prior to this decade were relatively secure with our goals and purposes. We pretty much knew what we were doing and why we were doing it. I know of no teachers today who feel this security. Whether we work in a rural or an urban area, it is impossible not to realize that we are caught up in a revolution of frighteningly swift change. The schools are the creators of change, but they are also the product of the same phenomena and, we are, whether we like it or not, embroiled in the turmoil.

Is there any solution to the dilemma, or are people to continue to live in these unhappy circumstances? Most assuredly, the forces of change will accelerate, not diminish. If solutions are to be found, it would seem obvious that they lie within the forces, not in opposition to them. First of all, the task of examining these forces seems equally obvious.

Explosion of Knowledge

Undoubtedly, the most important single factor forcing change today is the explosion of knowledge or the information revolution, as it is often called. Until very recently, teachers comfortably taught the content of one book in a year's period of time. They were comfortable with the logic that there was a fixed, immutable body of knowledge to be discovered, and if it were only presented in a logical sequential manner, the learner would discover it. Then Einstein discovered $E=mc^2$ and knowledge became something that was constructed, relative, created, never ending. In fact, now in some subject matter areas, perhaps most, it is even impossible to cover existing summaries of knowledge in one academic year.

Several years ago, a group of young engineers met at Tektronix, the world's largest manufacturer of electronic equipment. One of the engineers made the comment that it was necessary for him to spend at least three hours a day keeping current with the new technology. If he did not, within a very short period of time, he would be obsolete in the electronics field. Four years ago, a scientist from the University of Florida made the comment that it was impossible for his department to borrow a space consultant from the Cape Kennedy Project for more than three days. If the space scientist was gone for more than three days, he was virutally lost to the project and had to be phased in at a lower level. Just two years ago, the personnel manager of a large electronics firm, himself an electronics engineer, made the comment that there were only two institutions in America able to produce electronics engineers who were not obsolete at the point of graduation. All of the other institutions in the nation had neither the professional brains nor the hardware to produce engineers current in the modern technology and knowledge necessary to step immediately into an electronics position. Graduates for all other institutions had to be phased in through an inservice education program.

Perhaps a more effective means for understanding this phenomenon is to relate any scientific development with time. For example, if one develops a simple graph, relating the knowledge and applied technology of speed with time, and if we start the graph at year "zero" we find that speed was limited to that of a fast horse, approximately 30 miles per hour, for a period of almost 2,000 years. The steam engine was put on rails in 1804, but it was not until the twentieth century that speed began to increase with the development of the internal combustion engine and the subsequent application to both ground and air transportation. It increased at a tremendously rapid rate. By 1918 man was in the air and traveling at over 100 miles per hour. By 1946 the jet and rockets were flying and, today, speed has increased to over 2,000 miles per hour in the atmosphere and over 25,000 miles per hour in space. A geometric rise in speed was brought about by a geometric explosion of knowledge in a dramatically short period of time. In a period of approximately 50 years, man discovered the knowledge which moved him from the horse-drawn carriage to space travel.

Much is written about this phenomenon. For example, 90 percent of knowledge known to man today has been discovered since 1940. Knowledge has increased more in the past ten years than it has in the previous history of mankind; it will double again in the next seven years. Another rather amazing statistic tells us that 90 percent of all scientists and researchers throughout the history of mankind are alive today and producing knowledge in this constant process of changing our world. And, of course, the entire social, economic and political structure of the nation and the world has been affected by the cybernation revolution, or the age of automated self-regulating machines. For example, 14 men now attend the machines that produce 90 percent of the nation's light globes. Two workers at General Electric can produce 1,000 radios a day. Ten years ago, it would have taken 200 workers to produce that number of radios. Another example is the modern airline. Most airlines now have computer systems that will give instantaneous feedback at the ticket counter concerning any seat on any flight in the world. Not only that, computers now teach the computer technician the elements of the machine's operation. In 1964, a group of business and industrial leaders, in an attempt to arouse the nation to awareness, prefaced a report with the following statement.

> A new era of production has begun. Its principles of organization are as different from those of the industrial era, as those of the industrial era were different from the agricultural. The cybernation revolution has been brought about by the combination of the computer and the automated self-regulating machine. This results in a system of almost unlimited productive capacity which requires progressively less human labor. Cybernation is already reorganizing the economic and social system to meet its own needs.[1]

The knowledge explosion can be left after mentioning just one more point which educators must consider. Sociologists and economists say that one-half of the jobs have not yet been created which the primary children in our schools will fill as producing adults. Further, as adults, they probably will have to change occupations from three to five times in their lifetime. What implications do these predictions hold for teachers?

Population

Another contemporary social force of concern is the explosion of population. Starting with the beginning of life upon the face of the earth, it took millions of years until 1850 for the world to acquire one billion people. It took only 80 years, from 1850 to 1930, for the world to acquire two billion people. It took only 30 years from 1930 to 1960 for the world to acquire three billion. The fourth billion is expected to be here by 1975, just 15 years later. The United States alone is growing at the rate of 8,000 people every day. The San Francisco Bay Area is growing at the rate of 1,000 people every day. It has been predicted that by 1980 there will be an almost continuous metropolitan area from San Diego to Seattle.

---

[1] A statement by the Ad Hoc Committee on the Triple Revolution, 1120 Connecticut Avenue, N.W., Washington, D. C., March 22, 1964.

Despite the indication that in recent years the rate of acceleration seems to be decreasing, the fact remains that population growth still threatens the world with eventual social and economic chaos.

A social force which is directly related to the population explosion is urbanization. Since the industrial revolution, the mobility of the American people has been from the farm to the city. Today, because of the population explosion, the cities are growing at a tremendously rapid rate. Seventy percent of the American population now lives in or around metropolitan areas. Projections indicate 80 percent of the people of the United States will live in huge, complex metropolitan centers by 1975.

The problem being faced right now, today, related to this force of urbanization is the exodus of the middle-class citizen to the suburbs, leaving within the city a corps of culturally deprived individuals. With the money and skills necessary to cope with large city problems being gradually diffused into the suburban areas, individuals confined to ghettos face conditions almost impossible to overcome. The problems of the inner city are great. Unless we sincerely wish to see a major portion of our nation's population committed to social and economic dependence on the more affluent individuals, or this same group in constant revolt, all of us in America face the problem of dealing with the complexities of an urban society.

The Rationale for Change

Related to the population explosion and urbanization is the growing problem of the large impersonal bureaucratic organization. The age of the small farmer, small businessman and small private industry has virtually disappeared from the urban areas of America. There are notable exceptions, of course, but the fact remains that it is extremely difficult for an individual to enter into competition with the corporate giants of today. As our social problems have increased in direct proportion to the exploding population and urbanization, our governmental institutions have grown larger, more bureaucratic and impersonal. One has the impression that government today is controlled by the technical consultant. This is the individual in the Homburg hat carrying a Samsonite briefcase, who perhaps makes no more money than you or I and doesn't control money or people, but controls knowledge which may be only an infinitesimal part of the vast system. How do we cope with the impersonal nature of bigness?

International Relationships

Another factor to be considered is the nature of international relationships. Because of the technology explosion, the barriers of time and distance in this world have been destroyed. Whether or not one feels that the United States should serve a "police function" in the world, or should insure that its economic and polictical system is the one others should live by, certainly no one can feel that other people in the world can be ignored by this nation. Consequently, the problem of human relations, the task of understanding and working with people of all races, all cultures, all creeds; faces every individual. How should this human relations problem be dealt with? How can the kind of trust relations be developed and maintained which can make it possible to deal openly, forcefully and directly with world problems? One still finds incidents in the public schools in which children are actually taught an ethnocentric vision of other cultures. For example, all Africans live in grass huts, all Eskimos live in snow igloos, all Dutch children wear wooden shoes. What is the world really like? Kimball Wiles has prepared some interesting notes on this idea in a statement called, "The Strange Town."[2]

> If in our imagination we might compress the total population of the world, now more than 2 1/2 billion persons, into a community of 1000 persons living in a single town, the following picture of the contrast we would, then, vividly see.
>
> Sixty persons would represent the United States population; the rest of the world would be represented by 940 persons. The 60 Americans would be receiving half of the total income of the entire community; the 940 other persons would share the remaining half.
>
> Of the Americans in the town, 36 would be members of the Christian churches; and 24 would not. In the town as a whole about 330 people would be classified as Christians and 670 would not be so classified. At least 80 people in the town would be believing communists and 379 others would be under communist domination.
>
> Classified as to skin color, 303 people would be white and 697 would be classified as colored. The 60 Americans would have an average life expectancy of 70 years; all other 940 would average under 40 years.
>
> The 60 Americans would possess 15 1/2 times as much goods per person as all the rest of the people. On the average they would produce 16 percent of the town's total food supply, but would consume all but 1 1/2 percent of that and keep most of it for their own use in expensive storage equipment. Since most of the 940 non-Americans in the community would always be hungry and never quite know when they would get enough to eat, the situation created by this disparity in food supply and in the existence of

---

[2] Kimball Wiles. "The Strange Town." Presented to the Oregon Association for Supervision and Curriculum Development, Oregon State Department of Education. Salem, Oregon, 1963. (Mimeo)

> vast food reserves becomes readily apparent, particularly in view of the fact that Americans already eat 72 percent above maximum requirements.
>
> Of the community's total supply of electric power, the 60 Americans would have 12 times as much as all the rest; 22 times as much coal; 21 times as much oil and gasoline; 50 times as much steel, and 50 times as much in general equipment of all kinds. Of the 60 Americans, the lowest income groups would be better off than the average in much of the rest of the town....
>
> With the exception of perhaps 200 persons representing Western Europe and a few favored classes in other areas, like South America, South Africa and Australia, and a few wealthy Japanese, literally most of the non-American people in this imaginary compressed community would be ignorant, poor, hungry and sick. Half of them would be unable to read or write.
>
> Half of the people of this community would never have heard of Jesus Christ, or what he taught. On the other hand more than half would be hearing about Karl Marx, Nicolai Lenin, Joseph Stalin, Nikita Khruschev and other communist leaders.

Look at international interdependence in terms of the human rights revolution. Regardless of your feelings concerning other people who are different from you, the fact remains, the struggle of the Black and other culturally deprived ethnic groups for equal educational, economic, social and political opportunity is not to be denied. There is a tendency to look at this only in relation to the American Blacks. Some people become terribly concerned about riots and the term "black power," and begin to rationalize and justify feelings of prejudice; but one must stop to remember the struggle of the American Black is just the local manifestation of a world-wide social revolution in which deprived people everywhere--those other 940 individuals in the strange town--are making an effort to improve their economic and social position.

The Rationale for Change

Teachers need to face the fact that they are involved in a worldwide social revolution. They must face it and help their students to face it. Anything less is sheer ignorance, or apathy.

In a recent article, Franklin Murphy, the Chancellor of the University of California at Los Angeles, summed up the complexity of the contemporary social crisis.[3] He said:

> Essential to survival and progress for the remainder of the twentieth century is acceptance of the fact that we live in the midst of revolution--a period of unprecedented and rapid change without end in sight.
>
> Perhaps the reason we seem to be slow in effectively responding to new and ever changing reality is that such flux is a relatively new experience in the United States. Many of the educational, business and governmental leaders in this country grew to maturity and thus developed their intellectual, conditioned reflexes in the decade of the 1920's when the world seemed to be of straight construction and simple line.
>
> In those days the United States was comfortably isolated from troubles elsewhere in the world. Few doubted that the economics of Adam Smith, and the homilies of Benjamin Franklin were the guarantors of the good life. Most [people] lived on Sinclair Lewis' *Main Street* where the air was pure, the water clear and the city park was safe for young lovers at all hours. As long as the mail was delivered on time, the tariffs were kept high and [the] diplomats avoided entangling alliances, Washington was serving the nation well. The business community, unencumbered by government regulation and the Wagner Act, saw unlimited natural resources and growth in domestic consumer demand. No one could doubt that...the key [had been found] to continued business and national prosperity. The stock market proved itself. The university was, in general, a relatively isolated citadel of learning on a small tributary of the society's main stream. To this citadel a very limited number of... college-age young people went to spend a few leisurely years with their teachers (who, in those days, were nearly always there). Here the students prepared for the bustle of adult life, and the professors--unconsulted by industry or government--went about their unhurried, time-honored search for the truth.

---

[3] Franklin Murphy. "The Delicate Balance." Saturday Review. 51: 74+; January 13, 1968.

The Rationale for Change

In those halcyon days, government, business and education operated in relative isolation from one another and often in a climate of mutual hostility. Business saw no need for government regulation or interference of any kind. The public interest was well enough served by the laws of nature and laissez faire. The attitude of many businessmen toward the professor was embodied in the phrase: "He who can, does. He who cannot, teaches." The professor was often as intolerant and unreasoning. Businessmen tended to be compared with sharks--interested only in profits and power, with little concern for the welfare of their workers, their consumers, and the public weal. ...to both business and education, Washington was by choice remote and unimportant.

Beneath the placid surface, however, the prerevolutionary forces were well at work. Sigmund Freud had begun the process of unveiling the true complexity of man. Henry Ford had, to the disquiet of his contemporaries, not only created mass production, but pointed out by his pay policies that there was no purpose in increasing the flow of goods unless consumers had the money with which to purchase them. Albert Einstein had already published his fateful equation $E=mc^2$. John Maynard Keynes had reexamined laissez faire and found it wanting.

The end of the epoch and the surfacing of the revolution were marked by the collapse of the overheated, unregulated American economy. Never again were things to be the same and, for the first time, Americans began to realize that faith in so-called eternal verities and voluntary, unplanned reaction to problems were not enough. Government, having relied entirely on pragmatism, now turned in its distress to the theorist and the professors came to Washington. Thus began the irreversible growth of the role of government in national planning and regulation in the public interest. Shortly thereafter, Hitler set the world aflame and our military and government leaders quickly perceived that science, not military drill, was the name of the game. To Washington came more professors, and, ...[with them] the business and industrial leaders of the country. Thus, out of the involuntary pressures of depression, war and an explosion of knowledge; business, government and education were brought together into partnership.

In the twenty-five years since those eventful days the revolution has proceeded apace with undiminishing violence. Most [people] no longer live on *Main Street* but in megalopolis. ...repeated limited wars [have been fought]. The denial of civil rights and equal opportunity which [had been] assumed...in the writing of the Constitution and in Sunday worship now appears as the major domestic problem. The world's population growth threatens to inundate society itself. Around the world, the rich get richer, and the poor get relatively poorer. Man, in his unconcern for the future despoils his environment more effectively than any other species. The richest nation in the world cannot solve its balance-of-payments problem. And yet, in spite of unused industrial capacity, it cannot eradicate its islands of poverty and dispair, either. The city parks are no longer safe for young lovers at any hour.

The message is loud and clear. [Mankind] is involved in a struggle, a war if you will, and the stakes are cosmic. Revolutionary, unprecedented problems cry out for unprecedented answers. The solution to the multifaceted urban problem does not...lie only in the theoretical examination and abstract discussion of the problem by the academic community, nor in the expenditure of more government money. It lies in a planning and working relationship in which the know-how of industry is combined with the research and interpretation of the scholars and the resources and legal authority of the government, all brought together in integrated fashion. [There is the] precedent of the rapid, almost unbelievable development of the atom bomb but, of course, the problems of the cities are infinitely more complex than those in the construction of a nuclear weapon. ...antiquated systems of local governments created for a nineteenth century society [have been] simply overpowered by twentieth century reality. There is a continuing fine line that must be drawn between personal freedom of choice on the one hand and social necessity on the other. Yet, to balance this is the fact that just as the problems have mounted in size and complexity so have our knowledge and skill.

The American society now is confused, insecure and, from time to time, destructively irrational. [One] wonders if we have lost the capacity to manage ourselves and find the future. Yet it must be a fact that the potential to do so still lies within us. It is to be found in the new knowledge that pours out of university-based laboratories and classrooms and the superbly efficient business and industrial establishment. [This knowledge, plus] a recognition on the part of government that doctrinaire attitudes, based on the realities of the 1930's must give way to blending these unique resources into the only instrument in sight that can effectively serve the public interest.

The Rationale for Change

Ralph McGill has made a dramatic statement relating the historical development of the public schools to today's pressing need for change.[4]

> Public education came slowly to America. It was, for example, well past the turn of the century that the Southeastern states began general acceptance of public schools. There are men still living who remember the evangelical campaigns for the schools; the help and impetus given by wealthy northern philanthropists who were appalled by the lack of a real public school system. Rallies in court-houses and churches and at picnics and barbecues finally prevailed over the stubborn opposition to the hopeful idea of educating ALL the children.
>
> We now are at a point in our national development when we see with painful clarity that our present system for educating a diverse society is not adequate. (In reality, it never was.) One needs but to mention the high and increasing drop-out rate and the inability of the system to deal effectively with the significant number of children who are, in truth, "disadvantaged."
>
> The "disadvantaged," of course, have been with us always. (It is, for Southerners and for the people of the Plains States, Nebraska, the Dakotas, et al, but a few years back to the four or five-month, one-teacher school.)
>
> The ideal was to educate all our children. Unless we are prepared to abandon that ideal in the presence of admitted failure, an educational system that can deal with a diversity of problems must be devised. The diversity includes the "disadvantaged" (adult and child), integration, universal higher education, vocational training that fits students to a changing world of work, and the shift in the American economy from goods to services.
>
> Given this new set of problems, educators ask: "What should be the nature of this new educational system?"
>
> In the past most of the plans to improve the efficiency of U.S. education has been to do "more of the same."

---

[4] Ralph McGill. "Educating A Diverse Society." Medford Mail Tribune, The Ralph McGill Column. February 4, 1966. By permission of The Atlanta Constitution.

The Rationale for Change

Today educators are under severe pressure to change the educational system so to make it more capable of dealing with the diversity of our national problem. Obviously, the school of the future--15 to 20 years from now--will be expected to serve the whole community, not merely the children.

Educators, under pressure to change the system, properly ask, "Change to what?"

We have seen the successful innovations of television, large and small group instruction, flexible scheduling, new facilities and so on. But nothing we have yet done has dealt successfully with the problems of disadvantaged children, integration, universal higher education (including the teaching of skills) and the close relationship between education and the changing world of work.

What, then, will educational systems look like 15 or 20 years from now?

It may be, some experts believe, that a comprehensive model system would involve bringing heretofore separate systems together in a new federation which would include universities, teacher training institutions, public schools, curriculum development centers, community agencies, business, industry (especially service industry) and research and development centers. The best innovations to date would be coordinated into a total system approach.

Years ago the little school house was left behind;

now, today's system must be discarded for more effective education.

The process of change is inevitable.

DATA-RETRIEVAL CHART

	Column 1 What is it?	Column 2 How does it affect society?	Column 3 What are the implications for education?
Explosion of Knowledge			
Population Explosion			
Urbanization			
Bureaucratic Organizations			
International Interdependence			
Communication Barriers			

REACTION TO THE RATIONALE FOR CHANGE

React to the quotations below in the following manner: "What implications do you see for the teaching process in the Year 2000?"

> Knowledge is being discovered at such a rapid rate that it is now impossible to cover the content in any subject.

> At least one-half of the jobs that primary children in our schools today will fill as adults in our economic society of the future have not yet been created.

> The struggle of the American Black is just the local manifestation of a world-wide social revolution in which deprived people everywhere are making an effort to obtain equal social, economic and political equality.

FIVE DIMENSIONS OF GROUP GROWTH

There are five dimensions along which groups typically develop and grow. They have to do with clarity about membership, influence, feelings, individual differences and productivity. People in new groups tend to concern themselves with these dimensions in the order just given.

1. Membership

   When you become part of a new group, the first thing you're apt to care about is what it will mean to be a member. How will others expect you to act? When should you speak and how should you go about it? If you say something as a joke, will others laugh or will they think you were being serious? Is it all right to come late, to leave early, to smoke, to dress informally? Will membership in this group facilitate or conflict with other roles you have in life? Will others in the group hold your same values and attitudes? Will membership in this group be stimulating, boring, exciting, threatening, rewarding, inconsequential?

2. Influence

   As the meaning of membership begins to get clear, attention generally turns to questions of influence. Who is the leader of this group? Is there a chairman? Will the "real" leader please stand up? How do decisions get made? In what ways do people try to influence each other? Are individuals open to letting others influence them? What opportunities are there for you to influence or carry out leadership functions? Are there individuals in the group who care more about the power of being leaders than they do about the goals and issues of the group?

3. Feelings

As norms of membership and influence become clear, the expression of feelings becomes increasingly important. When others like an idea or action, do they say so? When there is boredom, frustration or anger, is it shared openly so that it can be worked out constructively? Can you express your feelings freely as they occur so they aren't bottled and allowed to build up to a point where they burst through inappropriately? Do people wait until they get out the door to tell one or two colleagues how they really felt about the meeting? Is the expression of negative feelings seen as honest feedback that can help, rather than as a destructive attack? Is expression of positive feelings seen, again, as honest feedback, rather than simply trying to influence or "gilding the lily."

4. Individual Differences

Each member of a group represents certain unique experiences, knowledge and skills. Few groups seem to reach a point where they take maximum advantage of these individual differences. It's rather common for members of a group to reach a level of sharing feelings where each sees the others as likable because they are pretty much the same as himself. This is sometimes referred to as the "honeymoon stage." If enough trust develops, the members may begin to be able to both recognize and value the individual differences that each possesses. At this point, a new set of questions takes on meaning. Do the members take the time and effort to learn about the experiences, attitudes, knowledge, values, skills and ideologies of each other? Does each work at sharing his own ideas in order to get others' reactions and different ways of looking at issues? Do they let each other know that they appreciate these differences even when they don't necessarily agree with them?

5. Productivity

Most groups exist for a purpose that involves some kind of product. It simply might be to have fun together. It might be to build better mouse traps or to improve the learning experiences of children. The product of many groups seems to tend toward being a "lowest common denominator" of the potential of which the individuals in the group are capable. Depending upon how norms of membership, influence, feelings and individual differences get worked out, a group can reach a level of creative productivity. Ideas of different individuals can be combined into better new ideas of which no one person alone would have thought. These questions become important. How much energy goes into arguing about which ideas are "better" or "right" as compared to energy spent on developing new ideas from combining old ones? Is effort spent on diagnosing situations to bring out underlying issues? When problems are raised, is a value placed on working them through thoroughly as opposed to moving quickly to take action? Do members take the time to seek your reactions and ideas? Do the norms of the group's organization support your having the time and opportunity to give your reactions and ideas?

Five Dimensions of Group Growth

There are two kinds of results of the ways that a new group works out these five dimensions of its growth. One concerns the way that tasks are accomplished. Tasks may be accomplished efficiently or inefficiently, thoroughly or only partially, with high quality or in a shoddy manner. The other kind of result has to do with maintenance of the group. There may be high esprit de corps with individuals pleased and excited to be members. On the other hand, there may be confusion and frustration with individuals readily leaving the group.

OVERVIEW OF THE PROCESSES

Content:	A formal presentation gives an overview of the theory and technique which will be presented in the training program.
Leadership Materials:	Overview of the Processes, Leadership Notes Overview of the Processes
Participant Materials:	Overview of the Processes
Rationale:	To provide a knowledge base for subsequent instructional content and processes, an introduction to the three thinking processes, their relationship to each other, and their relationship to a curriculum sequence
Objective:	Following the large group, formal presentation of Overview of the Processes, participants will demonstrate interest in and security with instructional content by active involvement in subsequent program activities.

The overview presentation is designed to give an initial introduction to the three thinking processes, their relationship to each other, and their relationship and application to a curriculum sequence.

This presentation may be given in either of two alternative ways:

I. Illustrated Lecture

II. Participant Reading of Overview of the Processes

Sequence	Time	Group	Activity
I	30	LG	Illustrated Lecture The instructional leader may wish to develop his own individualized presentation. This is understandable. Any lecture, however, should be based upon the materials provided to insure an effective understanding of the theory and research which forms the foundation of this program.
II	30	LG	Reading of Resource Material Refer to Overview of the Processes. Ask the participants to read the overview.

OVERVIEW OF THE PROCESSES

Everyone is aware that a tremendous amount of curriculum change is occurring. Regardless of the subject or the grade level taught, every teacher faces the responsiblity of implementing new instructional programs. Based upon the recognition that knowledge is significant only in relation to its application and the fact that the knowledge explosion has made it impossible to "cover" content in any area or discipline, school districts, state departments of education and curriculum development centers across the nation are engaged in designing new instructional programs.

Inherent within each such program is the implication that all teachers will be knowledgeable in at least two areas. First, it implies they will be able to select and/or order concepts and generalizations in a hierarchical sequence that builds logically from a factual base to higher levels of knowledge. Second, it implies the teacher will also be knowledgeable of, and skillful in, the process of inquiry. There are few teachers at any level who have had educational experiences, either preservice or inservice, to insure security in either process.

The purpose of this training program is to present a model which has proven helpful to teachers and curriculum developers in producing and implementing instructional programs designed to promote higher levels of knowledge and thought process.

STRUCTURE OF KNOWLEDGE

Factual Data

The development of this model is based upon a structure of knowledge that is hierarchical. At the base lies factual data. Obviously, in order to think one must have facts. Data must be available before it can be intellectually processed, and this instructional model places no less emphasis upon the acquisition of factual information than any other. In this case, the base of factual data is composed of items of specific information at the lowest available level of abstraction.

Concepts

The next higher level is that of concepts. All of us use concepts continually in our thinking and speaking. They are usually words or phrases, designating categories which represent a body of factual data obtained through past intellectual and personal experiences: *transportation, communication, democracy, communism, environment, culture, community* and so forth.

These concepts are obtained and refined through a continual process of discrimination and organization of events. For example, the small toddler standing on the street corner with his father waiting for the light change points to something moving down the street. His father says, "Car, Billy, car." The child repeats, "car," receiving the reward which he deserves. However, something else moves across the intersection and Billy responds with, "car," and receives the comment, "No, son, that's a truck." Thus Billy begins his first set of discriminating experiences in the process of developing his concept of transportation. Initially, the elements of car, truck and bus will be organized on a "descriptional" basis, i.e., "things with wheels that move." Eventually, they will be organized on much more functional or abstract bases, "land vehicles, water vehicles, vehicles powered by an internal combustion engine, etc."

Overview of the Processes

The term "transportation" may be used effectively and logically early in the child's life. But the process of discrimination and refinement goes on as long as knowledge is discovered and experienced. As concepts are developed, they become increasingly abstract and inclusive as more events or elements are added and accommodated within them. For example, what is being described below:

> A round object, approximately the size of a baseball or softball, with an orange-colored peel which when removed leaves a fleshy, segmented center containing a tangy juice

You say, "An orange?" Very good! However, now think of words which would categorize each of the following groups:

1. An orange and an apple
2. An orange, an apple and a potato
3. An orange, an apple, potato and water

In each case, it is evident that adding a new element resulted in losing specific characteristics of the former category, and resulted in a category that was considerably more abstract and inclusive.

Another factor that needs to be recognized in the process of concept development is that whatever concept is uttered by an individual, the *basis* of that concept is unique to that individual. It is based upon the unique set of discriminating experiences which that person has had. It cannot be assumed that one person's concept of "democracy" is the same as another's concept of "democracy." The discrimination, organization and refinement of events leading to the expression of each concept are without question, unique to one individual and different from anyone else's. Consequently, understanding of the basis of concept development is an extremely important element in the teacher's repertoire of teaching strategies.

Overview of the Processes

In summary then:

1. Concepts can usually be stated as a word or a phrase which has noun quality and represents a category.
2. They are obtained by discrimination and combination of elements or events.
3. They become more abstract and inclusive as more elements or events are added. More definitive, less abstract, concepts may be subsumed under an inclusive concept.
4. The basis for a concept is unique to the person expressing it.

Generalizations

Finally, in this hierarchy of knowledge, the level of generalizations is the highest. In this case, consider the definition of a generalization as, "A statement of relationships among concepts, usually qualified by condition." For example, in the generalization, "Industry within an area is largely dependent upon the availability of raw materials, transportation and market," the concepts are easily recognizable. These include *area, industry, raw materials, transportation* and *market.* The qualifying word, "largely," represents the condition.

Most of the modern curriculum programs present generalizations as knowledge objectives. They may be called "basic ideas," or "understandings," but "a rose by any name...," they are generalizations.

> Members of a family have both responsibilities and privileges.
>
> As the size of the community changes, the need for services usually changes.
>
> The Cold War is essentially the result of two conflicting points of view toward the postwar world, that of the United States and that of the Soviet Union.
>
> Civilizations change when they meet a new culture. The change may be one of degree.
>
> Measures regarded as radical in one generation are often considered moderate in the next.

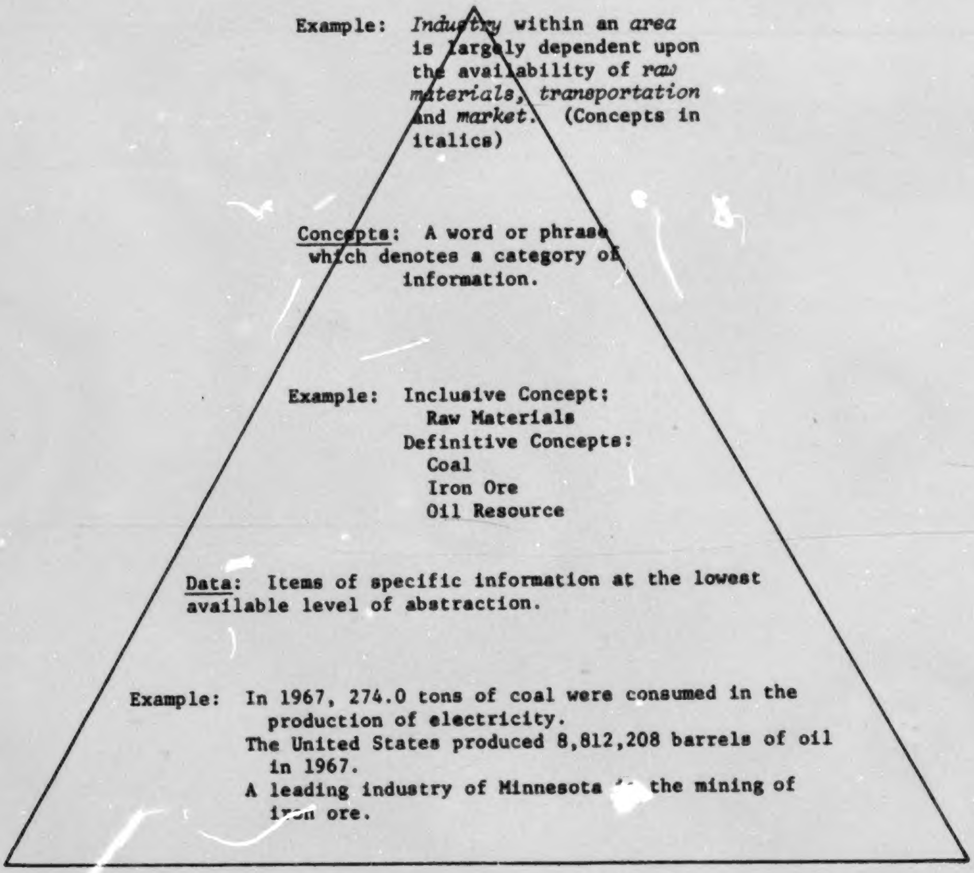
Overview of the Processes

In each case the statement presents relationships between concepts, usually qualified by condition.

It should be indicated at this point, however, that there are some who will disagree with the thesis that the generalization level of knowledge is higher than that of the conceptual level. And, indeed, most knowledge can be subsumed under large, abstract conceptual categories. However, the fact remains that within a generalization, one finds concepts. The interrelationship of these provides a relatively simple and convenient structure for developing an inductively organized learning sequence. In summary, a structure of knowledge may be shown as on the following page.

Overview of the Processes

STRUCTURE OF KNOWLEDGE



Generalization: A statement of relationships, among concepts, usually qualified by condition.

Example: *Industry* within an *area* is largely dependent upon the availability of *raw materials*, *transportation* and *market*. (Concepts in italics)

Concepts: A word or phrase which denotes a category of information.

Example: Inclusive Concept:
  Raw Materials
Definitive Concepts:
  Coal
  Iron Ore
  Oil Resource

Data: Items of specific information at the lowest available level of abstraction.

Example: In 1967, 274.0 tons of coal were consumed in the production of electricity.
The United States produced 8,812,208 barrels of oil in 1967.
A leading industry of Minnesota is the mining of iron ore.

Overview of the Processes

STRUCTURE OF PROCESS

Memory

The development of this instructional model is based upon a structure of process which is also hierarchical. At its base lies the thought process of memory-recall. The basic intellectual process called for is remembering. In the learning situation the student is expected to store certain information in his mind. The behavior expected is the recall and expression of this information, usually in the same form in which it was stored. Examples of questions which call for this process are:

What is the definition of a proper noun?

What are the steps in the scientific approach to problem solving?

How many senators and representatives are there in the U.S. Congress?

Although this process is most easily recognized as applying to the factual data level of knowledge, the process can be applied to any previously learned and stored body of knowledge. The student is functioning at this level every time he simply recalls and expresses verbatim any previously stored information, whether it be facts, generalizations, rules or procedures.

Translation

A step above memory-recall is the process of translation. This is the intellectual process of translating or changing ideas into a parallel form. Translation thinking is quite literal and does not require students to discover intricate relationships, implications or subtle meanings. However, it does require analysis and organization of specific data in order to translate into a logically parallel form. Examples of questions which call for this process are:

> Can you answer the question in your own words?
>
> Summarize the main ideas expressed in this paragraph.
>
> Organize the most important information from your research and present it in chart and graph form.

This process is most directly applied in working with concepts. When students are asked to organize information according to some logical basis, and to express it in a form different from that originally presented, they are utilizing the translation process. In the instructional model presented here, the students are asked to acquire, organize and present factual data which is categorized on a logical basis. In so doing they are functioning at the concept level of knowledge and the translation level of process.

Interpretation

The next, but significantly higher level of thought process, is that of interpretation. This is the intellectual process of examining relationships and generalizing from known data. The essential characteristic is that the student relates facts, ideas, concepts, values, skills. To relate means to discover or use relationships between two or more ideas. At any time that students are asked to draw a relationship between two parallel bodies of knowledge and to express an inference or conclusion, they are engaged in the interpretation process. Examples of questions which call for this level of thought are:

> What differences do you see in the governments of these three countries?
>
> What generalizations can be made about religion and customs for the three countries? (Restricted Generalization)

> What generalization can be made that would cover all the areas we have studied for the three countries? (Inclusive Generalization)

Interpretation questions ask the learner to examine relationships and to state an idea which is based logically on the data. In the instructional model presented in this training program, learners are required to acquire bodies of factual knowledge, to translate or organize it logically in conceptual categories, to analyze relationships and to interpret for generalizations which can be supported by the data.

Application

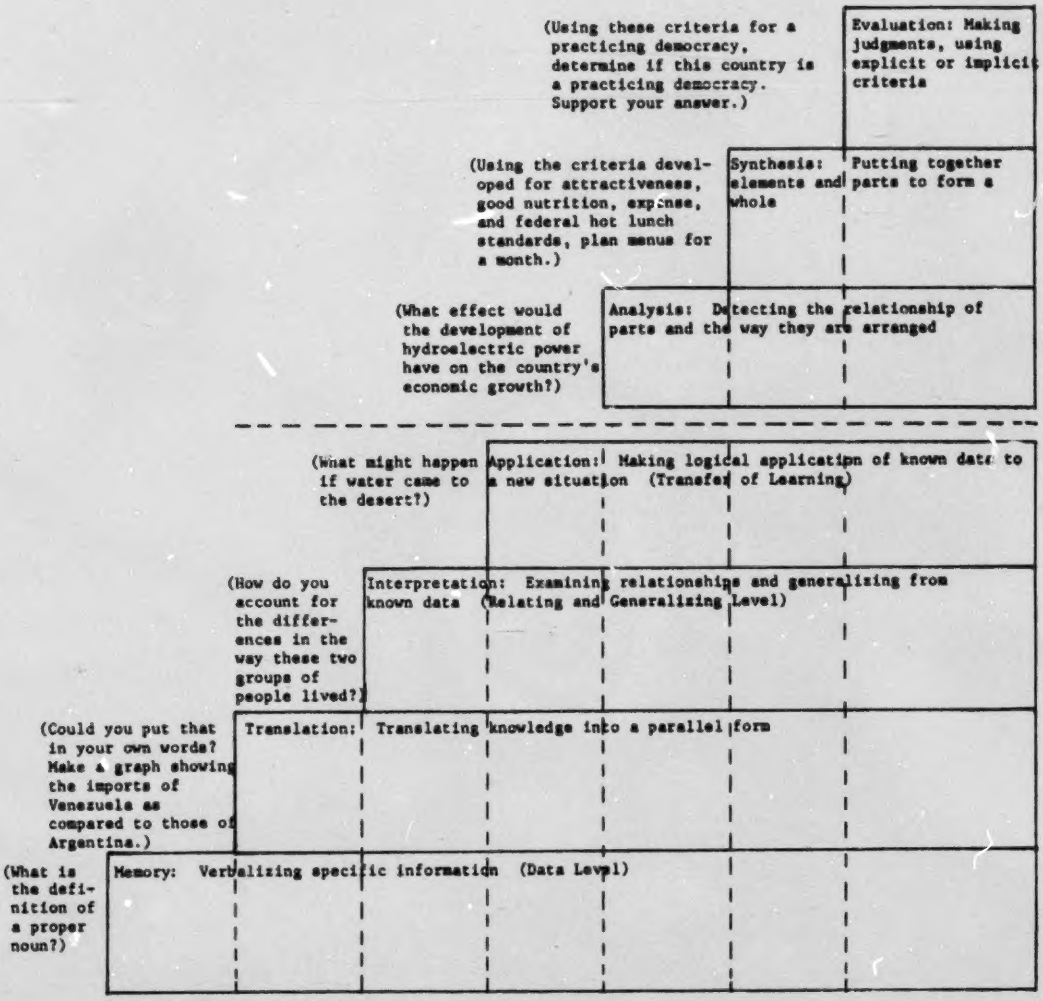
Application is the next step above the interpretation level of thought. This intellectual process requires a logical application of previously acquired knowledge to a new situation. In this world of rapid scientific, social and economic change, educators must be concerned about preparing students for life in an unknown future. The application process gives students practice in transfer of training. Examples of questions which call for this process are:

> Based upon our previous study of primitive culture, describe the food, clothing and shelter of a group of primitives living in the following environment: (Description of Environment)
>
> Write a letter to the Chamber of Commerce asking for information concerning the tourist industry of the area. (Follows lessons on format of business letters)

Applying this level of process to the structure of knowledge is asking the student to go beyond the level of interpreting a body of knowledge and stating conclusions. It is asking him to do something with that knowledge--to utilize the factual data, concepts and generalizations in presenting a logical explanation for a new, oftentimes discrepant, situation. Solving the problem, "What if ample supplies of water became available in the Mojave Desert?" requires the application of a great deal of geographical, social, economic and political data. While the higher levels of thinking processes--analysis, synthesis and evaluation--may be provided for, and do occur within the context of this instructional model, specific attention is given primarily to the memory, translation, interpretation and application levels. The chart on the following page illustrates this hierarchy of process.

Overview of the Processes

A STRUCTURE OF PROCESS*



(Using these criteria for a practicing democracy, determine if this country is a practicing democracy. Support your answer.)

Evaluation: Making judgments, using explicit or implicit criteria

(Using the criteria developed for attractiveness, good nutrition, expense, and federal hot lunch standards, plan menus for a month.)

Synthesis: Putting together elements and parts to form a whole

(What effect would the development of hydroelectric power have on the country's economic growth?)

Analysis: Detecting the relationship of parts and the way they are arranged

(What might happen if water came to the desert?)

Application: Making logical application of known data to a new situation (Transfer of Learning)

(How do you account for the differences in the way these two groups of people lived?)

Interpretation: Examining relationships and generalizing from known data (Relating and Generalizing Level)

(Could you put that in your own words? Make a graph showing the imports of Venezuela as compared to those of Argentina.)

Translation: Translating knowledge into a parallel form

(What is the definition of a proper noun?)

Memory: Verbalizing specific information (Data Level)

*The above hierarchy of thought processes has been taken principally from two sources:

Bloom, Benjamin S. Taxonomy of Educational Objectives. Handbook I, Cognitive Domain. David McKay: New York, 1956.

Sanders, Norris M. Classroom Questions, What Kinds? New York: Harper and Row, 1966.

Overview of the Processes

INSTRUCTIONAL MODEL

The instructional model to be presented for using these related structures of knowledge and process is based upon the research activities of the late Dr. Hilda Taba. As with any successful teaching method or innovation, you will recognize some techniques which you, and other good teachers, have long utilized. As a matter of fact, this is how Dr. Taba began her research--by observing and carefully documenting what teachers do that results in students functioning at higher levels of knowledge and process. Her subsequent research resulted in a systematized, logically sequenced order of developing cognitive processes applicable to teaching at all levels and in all subject areas. Perhaps, to better understand this instructional model, it would be helpful to compare it with other familiar types of teaching.

Textbook: Everyone has experienced textbook teaching, either as pupils or as teachers. Textbook teaching, if limited solely to the contents of the textbook, is as dull or as interesting as the book itself. Educational objectives are centered primarily at the factual level with questioning strategies designed to elicit responses on the memory level.

Lecture-Discussion: In most cases, the lecture-discussion mode of teaching also operates on the low level of memory process. The lecture may effectively supplement the textbook as a source of data, but unless the instructor is highly skilled in developing questioning strategies which move the learner to the interpretation and application levels, learners usually remain passively mired in an overwhelming amount of factual data.

Overview of the Processes

Unit Instruction: In the unit approach, objectives are frequently limited to the recall level of knowledge, despite the fact that learning experiences may call for a great deal of student activity. Sometimes attitudes are included as objectives, although rarely is there presented a systematic method for developing them. The unit approach to teaching, regardless of the subject area or level, usually starts with an introduction designed to motivate learners and initially involve them in the subject matter of the unit. From this opening evolves a multitude of experiences designed for learning activities. Although many of these activities may be highly worthwhile, they are rarely programed in a sequential, accumulative manner and often are selected and presented on the basis of the teacher's interests rather than the specific academic needs of students.

The following characteristics of the instructional model "Higher Level Thinking Processes" give it uniqueness in relation to other teaching modes.

Multiple Objectives

A primary characteristic of this instructional program is that it calls for the development of four major objectives in an instructional sequence.

1. Knowledge. The program calls for a systematic development of a structure of knowledge with students acquiring a body of *factual data*, organizing it logically in relation to *conceptual categories*, and analyzing relationships to arrive at *generalizations*.
2. Skills. Skills, such as research skills, communication skills and group process skills, are taught in an organized manner as an integral part of the instructional program.

3. Attitudes. Sensitivity to feelings, development of value systems and a strong emphasis on viewing other cultures through their eyes, rather than perpetuating our traditional ethnocentric attitudes, are major objectives of the program.

4. Thinking Processes. This instructional model has as a primary objective the systematic development of higher level thinking processes. The program is structured in a manner to move learners from the memory-recall level of thought process to *translation* and organization of specific data, to *interpretation* and statement of generalizations, to the *application* of knowledge in new situations. The end goal is one of creating autonomous learners--students who are capable of functioning independently in the learning process.

Of these four objectives, only knowledge can be implemented through selection of subject matter content. The other three: skills, attitudes and cognitive processes are implemented through activity and teaching strategy.

The instructional model consists of three major cognitive tasks:

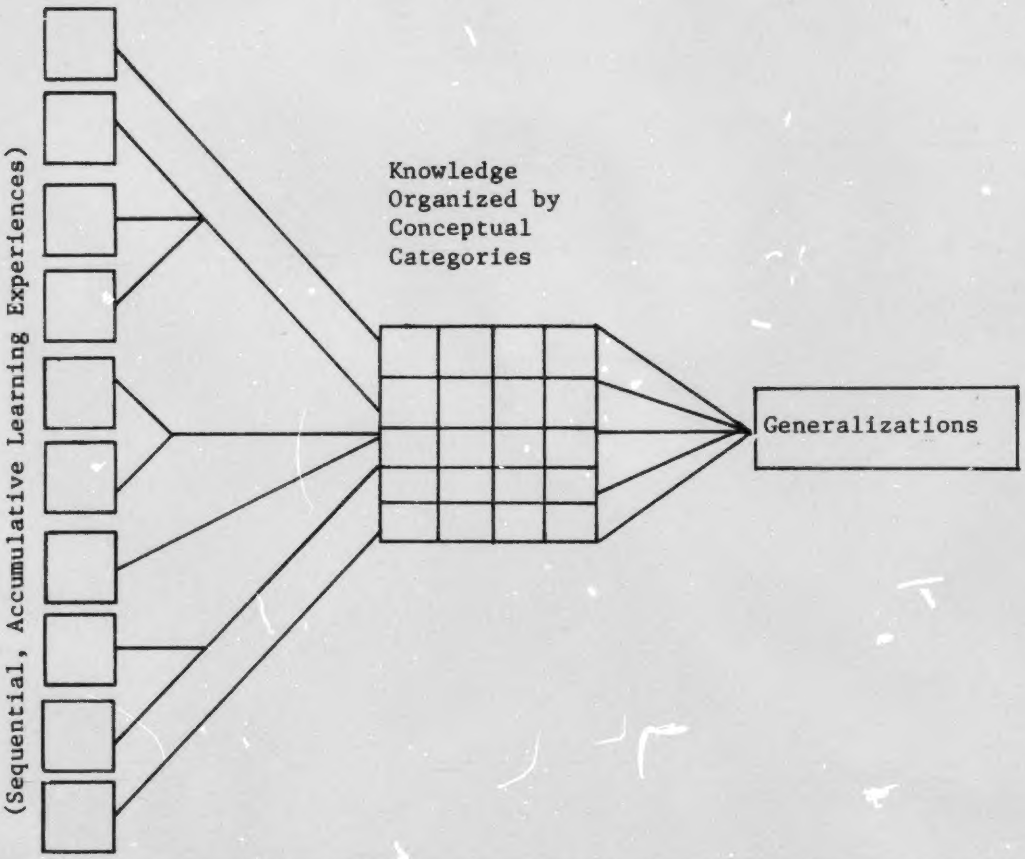
1. Concept Diagnosis
2. Interpretation of Data
3. Applications of Knowledge

The relationship of these three tasks may be diagramed as shown on the following page.

Overview of the Processes

INSTRUCTIONAL MODEL

Cognitive Task	Operations
Concept Diagnosis	A series of questions which results in diagnostic data, focus on unit, exercise in analysis of relationships.
Interpretation of Data	A series of questions which results in the discovery of principles, generalizations and inferences from differentiating the data, relating points to each other, determining cause and effect and going beyond what is given.
Application of Knowledge	A question or series of questions which requires the application of previously discovered knowledge to a new situation.


(Sequential, Accumulative Learning Experiences)
Knowledge Organized by Conceptual Categories
Generalizations

Overview of the Processes

INSTRUCTIONAL SEQUENCE

Concept Diagnosis

The instructional sequence begins with a thinking process which is titled "Concept Diagnosis." The purpose of this activity is to accomplish, exactly as the name implies, a diagnosis of the students' concept of the subject area to be studied. The analysis and verbalization of relationships and the categorization of specific knowledge in this process result in a great deal of diagnostic data.

Although the subtleties of the process will be examined in detail later, very simply, it begins with an open question:

What do you know about South America?

What comes to mind when you hear the word, socialism?

From this opening, all responses are accepted, misconceptions as well as correct conceptions, and listed on the board or a transparency. After this information is obtained, students are asked to analyze the listed items and organize them into groups according to their self-determined bases for categorizing. As might be imagined, this aspect of the process results in much active discussion and sometimes disagreement. Finally, students are asked to give the groups a label. Essentially, this is asking them to analyze the items within a group, determine the associational basis for their relatedness, and check each item for consistency with the label.

A class period devoted to concept diagnosis provides the teacher with diagnostic information concerning levels of knowledge, gaps in knowledge, abilities to perceive relationships and verbalize ideas, and to function effectively in group processes.

Overview of the Processes

Interpretation of Data

Instruction in subject matter begins after completion of concept diagnosis. Based upon the information obtained, learning activities are programed in a manner which sequentially and accumulatively builds knowledge, skills, attitudes and cognitive abilities. Subject matter is selected using criteria which guarantees its worthiness to be learned. Throughout the instructional sequence, students first learn how to translate and interpret information and, then, to present it in an organized manner for final interpretation by the entire class.

Planning Procedure

The teacher begins the planning process in advance of instruction by determining the basic subject matter he wants the students to know. Assuming that he wants them to be able to analyze a body of specific data, he must first determine what those generalizations are. Next, he must plan backwards to determine what information students will need in order to be able to discover them. The chart on the next page illustrates the planning sequence as contrasted to the teaching sequence.

Overview of the Processes

PLANNING-TEACHING SEQUENCES

Planning Sequence		Teaching Sequence
(The instructional unit is "planned" in the following order.)		(However, the unit is "taught" in the order shown.)
1.	**Generalization:** In primitive societies, culture is closely related to environment and level of technology.	3.
2.	**Inclusive concepts within generalization:** Primitive Societies Culture Environment Technology **Definitive concepts:** Plains Indians Northwest Indians Southwest Indians	2.
3.	**Data:** Factual data is put into some type of retrieval system. An illustrative model follows:	1.

Illustrative Model of Specific Knowledge

Primitive	Culture				Environment		Technology	
Societies	Food	Clothing	Shelter	Etc.	Topography	Climate	Tools	Methods
Plains Indians								
North-west Indians								
South-west Indians								

Overview of the Processes

In an instructional sequence on the study of primitive societies, a main generalization which one would wish students to discover and verbalize might be, "In primitive societies, culture is closely related to environment and level of technology." An analysis of this generalization quickly reveals that if students are going to be able to state this generalization they must have specific information in relation to the concepts of:

1. Primitive societies
2. Culture of those societies
3. Environment in which they live
4. Technology evident in each society

Using those concepts as a guide, an illustrative model may be constructed which indicates quite specifically what factual knowledge will have to be researched in order to develop them. Two or more primitive societies may be selected for study, culture can be broken down into the elements that constitute culture, environment can be looked at in detail and technology can be considered in relation to its components.

An illustration of how the specific factual data is utilized in the generalizing process of examining relationships and moving from low level to high level abstractions is shown on the next page. As you will notice, the process is one of asking students to analyze specific information, combine elements and move to a higher level abstraction, then combine those abstractions and move to still higher level abstractions.

THE PROCESSES OF GENERALIZING

Indian Group	Food (Concept)		Generalizations →		High Level Abstraction
Plains	The Sioux ate buffalo.	Factual Data	Plains Indians ate buffalo.	The Plains Indians obtained most of their food from their environment.	
Sioux	The Crow ate buffalo.				
	The Blackfoot ate buffalo.	Factual Data	Plains Indians ate uncultivated fruits and vegetables.		
	The Sioux ate wild gooseberries.				
Crow	The Crow ate huckleberries and chokecherries.				
Blackfoot	The Blackfoot ate the root of the Jack-In-The-Pulpit.		The Sioux raised some vegetables.		
	The Sioux raised some corn, squash and beans.				
Northwest Coast	Nootkas ate salmon, salmon eggs, clams, whale and dogfish oil.		Northwest Coast Indians were fish eaters.	The Northwest Coast Indians obtained their food from their environment.	The Indians utilized the plants and animals of their enviornment for food.
Nootka	Salmon, herring, halibut and smelt were eaten by the Salish.				
Salish	Tlingits ate salmon, smelt, haddock and halibut.		Wild berries, roots and tree bark provided food for the Northwest Coast Indians.		
Tlingit	Wild blackberries were eaten by the Nootkas.				
	The Salish ate Oregon grapes, currants and wild onions and the inner bark of maple, alder and hemlock.				
Southwest	Rabbits, deer and elk were used for food by the Hopi.		Southwest Indians used deer and some small animals for food. Much of the Southwest Indians' food was raised or gathered from wild plants.	The Southwest Indians obtained their food by hunting, gathering wild plants or cultivating plants found in their environment.	
Hopi	The Papago hunted deer for food.				
Papago	The Papago made jam, wine and flour from the giant Saguaro cactus.				
Apache	They planted cactus, grass seeds and mesquite bean pods.				
	The Hopi planted beans and corn.				
	The Apache gathered cactus fruits, mescal, mesquite bean pods, yucca fruit, piñon nuts, walnuts, acorns and berries.				

Overview of the Processes

It should be obvious now that the interpretation of data process consists of proceeding through a series of learning experiences which systematically and sequentially provide students with a body of knowledge. This process requires them to translate and organize the information according to conceptual categories and, finally, to analyze relationships within the data and verbalize generalizations which can be logically supported.

Application of Knowledge

To end with the interpretation of data and the statement of generalizations is not enough. As indicated previously, if students are to accommodate to the rapidly changing scientific and social world, they must be able to apply knowledge effectively to new, often unique, situations. Application of knowledge calls for this process:

Planning for the application of knowledge process requires the identification or development of a verifiable event or situation to which previously acquired knowledge may be applied. For example, when studying primitive societies, an environment entirely different from those studied could be described, with the students asked to predict what manner of primitive culture and technology might be found there. The extent to which students are able validly to apply previously learned data can then be verified by examining the primitive society actually existing in the environment described.

Training Program

The training program which you are about to experience will deal in considerable depth with these processes. Primarily social studies will be used as examples or illustrations. However, the strategies are applicable to any subject area, and any grade level. Those who teach in subjects other than social studies will face the added task of mastering this translation. Every effort will be made to assist in the process.

OVERVIEW OF THE PROCESSES

Everyone is aware that a tremendous amount of curriculum change is occurring. Regardless of the subject or the grade level taught, every teacher faces the responsiblity of implementing new instructional programs. Based upon the recognition that knowledge is significant only in relation to its application and the fact that the knowledge explosion has made it impossible to "cover" content in any area or discipline, school districts, state departments of education and curriculum development centers across the nation are engaged in designing new instructional programs.

Inherent within each such program is the implication that all teachers will be knowledgeable in at least two areas. First, it implies they will be able to select and/or order concepts and generalizations in a hierarchical sequence that builds logically from a factual base to higher levels of knowledge. Second, it implies the teacher will also be knowledgeable of, and skillful in, the process of inquiry. There are few teachers at any level who have had educational experiences, either preservice or inservice, to insure security in either process.

The purpose of this training program is to present a model which has proven helpful to teachers and curriculum developers in producing and implementing instructional programs designed to promote higher levels of knowledge and thought process.

STRUCTURE OF KNOWLEDGE

Factual Data

The development of this model is based upon a structure of knowledge that is hierarchical. At the base lies factual data. Obviously, in order to think one must have facts. Data must be available before it can be intellectually processed, and this instructional model places no less emphasis upon the acquisition of factual information than any other. In this case, the base of factual data is composed of items of specific information at the lowest available level of abstraction.

Concepts

The next higher level is that of concepts. All of us use concepts continually in our thinking and speaking. They are usually words or phrases, designating categories which represent a body of factual data obtained through past intellectual and personal experiences: *transportation, communication, democracy, communism, environment, culture, community* and so forth.

These concepts are obtained and refined through a continual process of discrimination and organization of events. For example, the small toddler standing on the street corner with his father waiting for the light change points to something moving down the street. His father says, "Car, Billy, car." The child repeats, "car," receiving the reward which he deserves. However, something else moves across the intersection and Billy responds with, "car," and receives the comment, "No, son, that's a truck." Thus Billy begins his first set of discriminating experiences in the process of developing his concept of transportation. Initially, the elements of car, truck and bus will be organized on a "descriptional" basis, i.e., "things with wheels that move." Eventually, they will be organized on much more functional or abstract bases, "land vehicles, water vehicles, vehicles powered by an internal combustion engine, etc."

Overview of the Processes

The term "transportation" may be used effectively and logically early in the child's life. But the process of discrimination and refinement goes on as long as knowledge is discovered and experienced. As concepts are developed, they become increasingly abstract and inclusive as more events or elements are added and accommodated within them. For example, what is being described below:

> A round object, approximately the size of a baseball or softball, with an orange-colored peel which when removed leaves a fleshy, segmented center containing a tangy juice

You say, "An orange?" Very good! However, now think of words which would categorize each of the following groups:

1. An orange and an apple
2. An orange, an apple and a potato
3. An orange, an apple, potato and water

In each case, it is evident that adding a new element resulted in losing specific characteristics of the former category, and resulted in a category that was considerably more abstract and inclusive.

Another factor that needs to be recognized in the process of concept development is that whatever concept is uttered by an individual, the *basis* of that concept is unique to that individual. It is based upon the unique set of discriminating experiences which that person has had. It cannot be assumed that one person's concept of "democracy" is the same as another's concept of "democracy." The discrimination, organization and refinement of events leading to the expression of each concept are without question, unique to one individual and different from anyone else's. Consequently, understanding of the basis of concept development is an extremely important element in the teacher's repertoire of teaching strategies.

Overview of the Processes

In summary then:

1. Concepts can usually be stated as a word or a phrase which has noun quality and represents a category.
2. They are obtained by discrimination and combination of elements or events.
3. They become more abstract and inclusive as more elements or events are added. More definitive, less abstract, concepts may be subsumed under an inclusive concept.
4. The basis for a concept is unique to the person expressing it.

Generalizations

Finally, in this hierarchy of knowledge, the level of generalizations is the highest. In this case, consider the definition of a generalization as, "A statement of relationships among concepts, usually qualified by condition." For example, in the generalization, "Industry within an area is largely dependent upon the availability of raw materials, transportation and market," the concepts are easily recognizable. These include *area, industry, raw materials, transportation* and *market*. The qualifying word, "largely," represents the condition.

Most of the modern curriculum programs present generalizations as knowledge objectives. They may be called "basic ideas," or "understandings," but "a rose by any name...," they are generalizations.

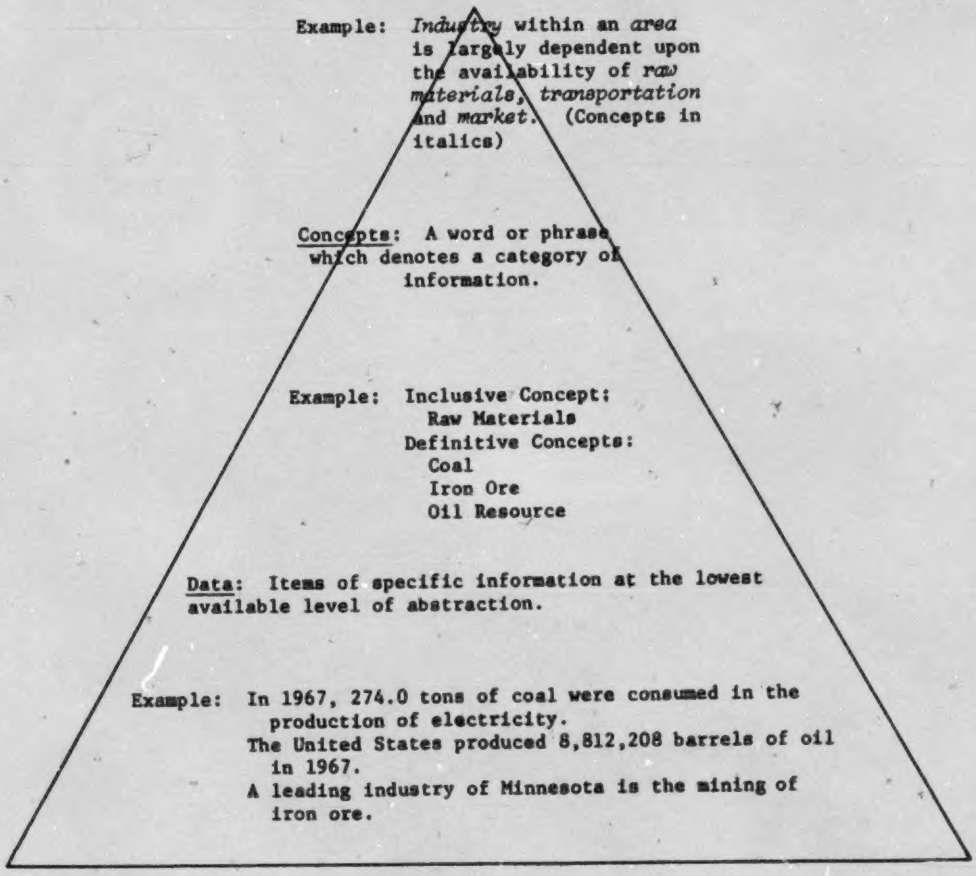
> Members of a family have both responsibilities and privileges.
>
> As the size of the community changes, the need for services usually changes.
>
> The Cold War is essentially the result of two conflicting points of view toward the postwar world, that of the United States and that of the Soviet Union.
>
> Civilizations change when they meet a new culture. The change may be one of degree.
>
> Measures regarded as radical in one generation are often considered moderate in the next.

In each case the statement presents relationships between concepts, usually qualified by condition.

It should be indicated at this point, however, that there are some who will disagree with the thesis that the generalization level of knowledge is higher than that of the conceptual level. And, indeed, most knowledge can be subsumed under large, abstract conceptual categories. However, the fact remains that within a generalization, one finds concepts. The interrelationship of these provides a relatively simple and convenient structure for developing an inductively organized learning sequence. In summary, a structure of knowledge may be shown as on the following illustration.

Overview of the Processes

STRUCTURE OF KNOWLEDGE



Generalization: A statement of relationships, among concepts, usually qualified by condition.

Example: *Industry* within an *area* is largely dependent upon the availability of *raw materials*, *transportation* and *market*. (Concepts in italics)

Concepts: A word or phrase which denotes a category of information.

Example: Inclusive Concept:
Raw Materials
Definitive Concepts:
Coal
Iron Ore
Oil Resource

Data: Items of specific information at the lowest available level of abstraction.

Example: In 1967, 274.0 tons of coal were consumed in the production of electricity.
The United States produced 8,812,208 barrels of oil in 1967.
A leading industry of Minnesota is the mining of iron ore.

Overview of the Processes

STRUCTURE OF PROCESS

Memory

The development of this instructional model is based upon a structure of process which is also hierarchical. At its base lies the thought process of memory-recall. The basic intellectual process called for is remembering. In the learning situation the student is expected to store certain information in his mind. The behavior expected is the recall and expression of this information, usually in the same form in which it was stored. Examples of questions which call for this process are:

What is the definition of a proper noun?

What are the steps in the scientific approach to problem solving?

How many senators and representatives are there in the U.S. Congress?

Although this process is most easily recognized as applying to the factual data level of knowledge, the process can be applied to any previously learned and stored body of knowledge. The student is functioning at this level every time he simply recalls and expresses verbatim any previously stored information, whether it be facts, generalizations, rules or procedures.

Translation

A step above memory-recall is the process of translation. This is the intellectual process of translating or changing ideas into a parallel form. Translation thinking is quite literal and does not require students to discover intricate relationships, implications or subtle meanings. However, it does require analysis and organization of specific data in order to translate into a logically parallel form. Examples of questions which call for this process are:

> Can you answer the question in your own words?
>
> Summarize the main ideas expressed in this paragraph.
>
> Organize the most important information from your research and present it in chart and graph form.

This process is most directly applied in working with concepts. When students are asked to organize information according to some logical basis, and to express it in a form different from that originally presented, they are utilizing the translation process. In the instructional model presented here, the students are asked to acquire, organize and present factual data which is categorized on a logical basis. In so doing they are functioning at the concept level of knowledge and the translation level of process.

Interpretation

The next, but significantly higher level of thought process, is that of interpretation. This is the intellectual process of examining relationships and generalizing from known data. The essential characteristic is that the student relates facts, ideas, concepts, values, skills. To relate means to discover or use relationships between two or more ideas. At any time that students are asked to draw a relationship between two parallel bodies of knowledge and to express an inference or conclusion, they are engaged in the interpretation process. Examples of questions which call for this level of thought are:

> What differences do you see in the governments of these three countries?
>
> What generalizations can be made about religion and customs for the three countries? (Restricted Generalization)

Overview of the Processes

> What generalization can be made that would cover all the areas we have studied for the three countries? (Inclusive Generalization)

Interpretation questions ask the learner to examine relationships and to state an idea which is based logically on the data. In the instructional model presented in this training program, learners are required to acquire bodies of factual knowledge, to translate or organize it logically in conceptual categories, to analyze relationships and to interpret for generalizations which can be supported by the data.

Application

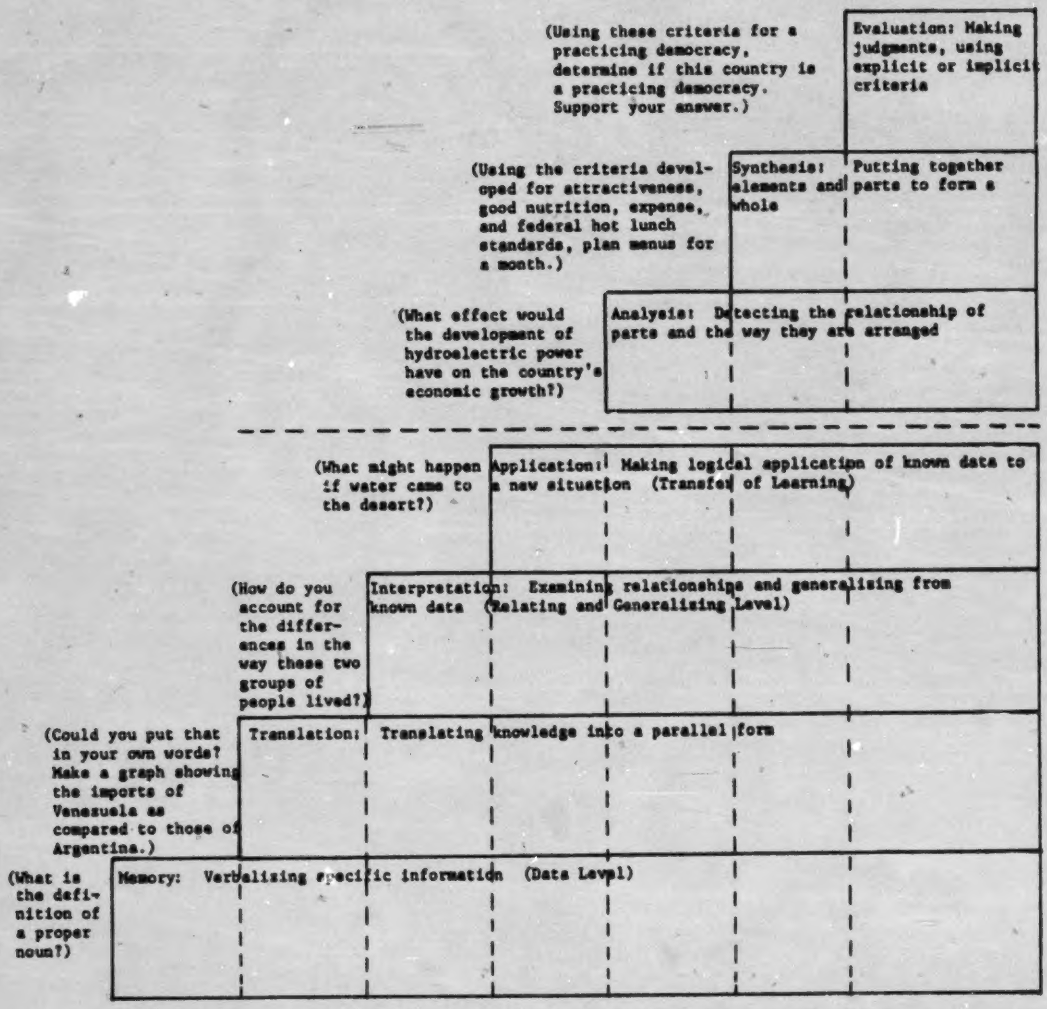
Application is the next step above the interpretation level of thought. This intellectual process requires a logical application of previously acquired knowledge to a new situation. In this world of rapid scientific, social and economic change, educators must be concerned about preparing students for life in an unknown future. The application process gives students practice in transfer of training. Examples of questions which call for this process are:

> Based upon our previous study of primitive culture, describe the food, clothing and shelter of a group of primitives living in the following environment: (Description of Environment)
>
> Write a letter to the Chamber of Commerce asking for information concerning the tourist industry of the area. (Follows lessons on format of business letters)

Applying this level of process to the structure of knowledge is asking the student to go beyond the level of interpreting a body of knowledge and stating conclusions. It is asking him to do something with that knowledge--to utilize the factual data, concepts and generalizations in presenting a logical explanation for a new, oftentimes discrepant, situation. Solving the problem, "What if ample supplies of water became available in the Mojave Desert?" requires the application of a great deal of geographical, social, economic and political data. While the higher levels of thinking processes--analysis, synthesis and evaluation--may be provided for, and do occur within the context of this instructional model, specific attention is given primarily to the memory, translation, interpretation and application levels. The chart on the following page illustrates this hierarchy of process.

Overview of the Processes

A STRUCTURE OF PROCESS*



(Using these criteria for a practicing democracy, determine if this country is a practicing democracy. Support your answer.)

Evaluation: Making judgments, using explicit or implicit criteria

(Using the criteria developed for attractiveness, good nutrition, expense, and federal hot lunch standards, plan menus for a month.)

Synthesis: Putting together elements and parts to form a whole

(What effect would the development of hydroelectric power have on the country's economic growth?)

Analysis: Detecting the relationship of parts and the way they are arranged

(What might happen if water came to the desert?)

Application: Making logical application of known data to a new situation (Transfer of Learning)

(How do you account for the differences in the way these two groups of people lived?)

Interpretation: Examining relationships and generalizing from known data (Relating and Generalizing Level)

(Could you put that in your own words? Make a graph showing the imports of Venezuela as compared to those of Argentina.)

Translation: Translating knowledge into a parallel form

(What is the definition of a proper noun?)

Memory: Verbalizing specific information (Data Level)

*The above hierarchy of thought processes has been taken principally from two sources:

Bloom, Benjamin S. Taxonomy of Educational Objectives. Handbook I, Cognitive Domain. David McKav: New York, 1956.

Sanders, Norris M. Classroom Questions, What Kinds? New York: Harper and Row, 1966.

Overview of the Processes

INSTRUCTIONAL MODEL

The instructional model to be presented for using these related structures of knowledge and process is based upon the research activities of the late Dr. Hilda Taba. As with any successful teaching method or innovation, you will recognize some techniques which you, and other good teachers, have long utilized. As a matter of fact, this is how Dr. Taba began her research--by observing and carefully documenting what teachers do that results in students functioning at higher levels of knowledge and process. Her subsequent research resulted in a systematized, logically sequenced order of developing cognitive processes applicable to teaching at all levels and in all subject areas. Perhaps, to better understand this instructional model, it would be helpful to compare it with other familiar types of teaching.

Textbook: Everyone has experienced textbook teaching, either as pupils or as teachers. Textbook teaching, if limited solely to the contents of the textbook, is as dull or as interesting as the book itself. Educational objectives are centered primarily at the factual level with questioning strategies designed to elicit responses on the memory level.

Lecture-Discussion: In most cases, the lecture-discussion mode of teaching also operates on the low level of memory process. The lecture may effectively supplement the textbook as a source of data, but unless the instructor is highly skilled in developing questioning strategies which move the learner to the interpretation and application levels, learners usually remain passively mired in an overwhelming amount of factual data.

Overview of the Processes

Unit Instruction: In the unit approach, objectives are frequently limited to the recall level of knowledge, despite the fact that learning experiences may call for a great deal of student activity. Sometimes attitudes are included as objectives, although rarely is there presented a systematic method for developing them. The unit approach to teaching, regardless of the subject area or level, usually starts with an introduction designed to motivate learners and initially involve them in the subject matter of the unit. From this opening evolves a multitude of experiences designed for learning activities. Although many of these activities may be highly worthwhile, they are rarely programed in a sequential, accumulative manner and often are selected and presented on the basis of the teacher's interests rather than the specific academic needs of students.

The following characteristics of the instructional model "Higher Level Thinking Processes" give it uniqueness in relation to other teaching modes.

Multiple Objectives

A primary characteristic of this instructional program is that it calls for the development of four major objectives in an instructional sequence.

1. Knowledge. The program calls for a systematic development of a structure of knowledge with students acquiring a body of *factual data*, organizing it logically in relation to *conceptual categories*, and analyzing relationships to arrive at *generalizations*.
2. Skills. Skills, such as research skills, communication skills and group process skills, are taught in an organized manner as an integral part of the instructional program.

3. Attitudes. Sensitivity to feelings, development of value systems and a strong emphasis on viewing other cultures through their eyes, rather than perpetuating our traditional ethnocentric attitudes, are major objectives of the program.
4. Thinking Processes. This instructional model has as a primary objective the systematic development of higher level thinking processes. The program is structured in a manner to move learners from the memory-recall level of thought process to *translation* and organization of specific data, to *interpretation* and statement of generalizations, to the *application* of knowledge in new situations. The end goal is one of creating autonomous learners--students who are capable of functioning independently in the learning process.

Of these four objectives, only knowledge can be implemented through selection of subject matter content. The other three: skills, attitudes and cognitive processes are implemented through activity and teaching strategy.

The instructional model consists of three major cognitive tasks:

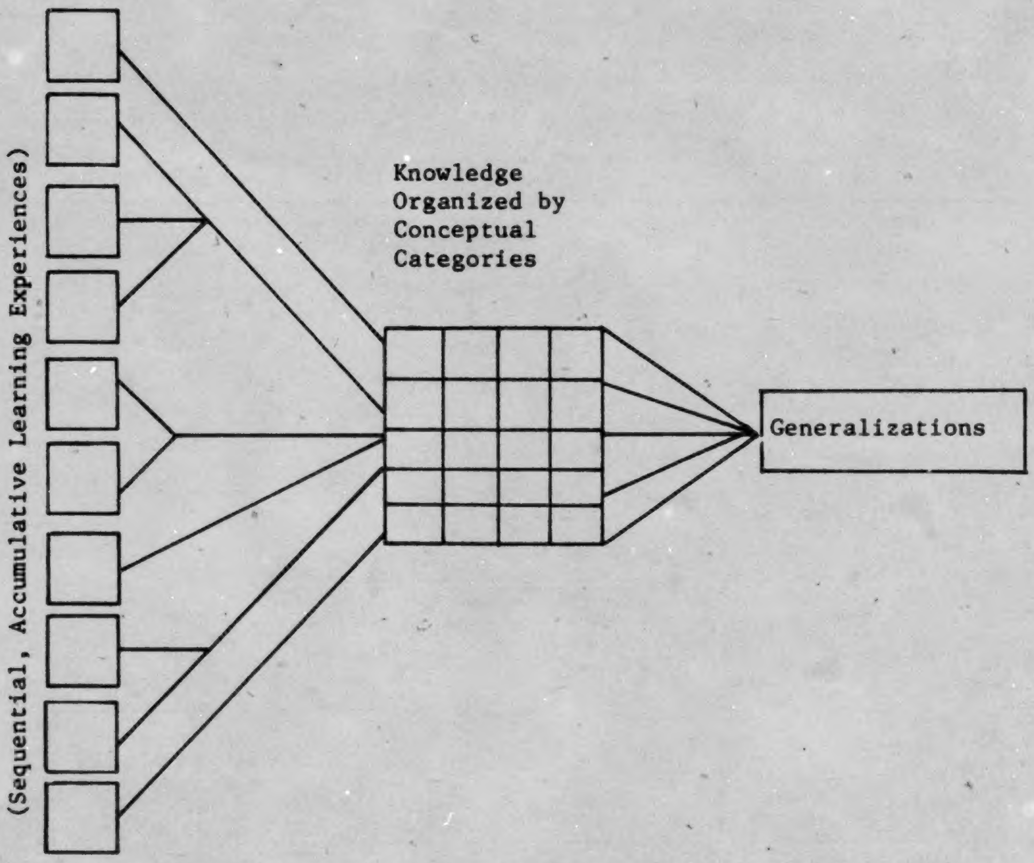
1. Concept Diagnosis
2. Interpretation of Data
3. Applications of Knowledge

The relationship of these three tasks may be diagramed as follows:

Overview of the Processes

INSTRUCTIONAL MODEL

Cognitive Task	Operations
Concept Diagnosis	A series of questions which results in diagnostic data, focus on unit, exercise in analysis of relationships.
Interpretation of Data	A series of questions which results in the discovery of principles, generalizations and inferences from differentiating the data, relating points to each other, determining cause and effect and going beyond what is given.


(Sequential, Accumulative Learning Experiences)
Knowledge Organized by Conceptual Categories
Generalizations

Application of Knowledge	A question or series of questions which requires the application of previously discovered knowledge to a new situation.

Overview of the Processes

INSTRUCTIONAL SEQUENCE

Concept Diagnosis

The instructional sequence begins with a thinking process which is titled "Concept Diagnosis." The purpose of this activity is to accomplish, exactly as the name implies, a diagnosis of the students' concept of the subject area to be studied. The analysis and verbalization of relationships and the categorization of specific knowledge in this process result in a great deal of diagnostic data.

Although the subtleties of the process will be examined in detail later, very simply, it begins with an open question:

What do you know about South America?

What comes to mind when you hear the word, socialism?

From this opening, all responses are accepted, misconceptions as well as correct conceptions, and listed on the board or a transparency. After this information is obtained, students are asked to analyze the listed items and organize them into groups according to their self-determined bases for categorizing. As might be imagined, this aspect of the process results in much active discussion and sometimes disagreement. Finally, students are asked to give the groups a label. Essentially, this is asking them to analyze the items within a group, determine the associational basis for their relatedness, and check each item for consistency with the label.

A class period devoted to concept diagnosis provides the teacher with diagnostic information concerning levels of knowledge, gaps in knowledge, abilities to perceive relationships and verbalize ideas, and to function effectively in group processes.

Overview of the Processes

Interpretation of Data

Instruction in subject matter begins after completion of concept diagnosis. Based upon the information obtained, learning activities are programed in a manner which sequentially and accumulatively builds knowledge, skills, attitudes and cognitive abilities. Subject matter is selected using criteria which guarantees its worthiness to be learned. Throughout the instructional sequence, students first learn how to translate and interpret information and, then, to present it in an organized manner for final interpretation by the entire class.

Planning Procedure

The teacher begins the planning process in advance of instruction by determining the basic subject matter he wants the students to know. Assuming that he wants them to be able to analyze a body of specific data, he must first determine what those generalizations are. Next, he must plan backwards to determine what information students will need in order to be able to discover them. The chart on the next page illustrates the planning sequence as contrasted to the teaching sequence.

Overview of the Processes

PLANNING-TEACHING SEQUENCES

Planning Sequence (The instructional unit is "planned" in the following order.)		**Teaching Sequence** (However, the unit is "taught" in the order shown.)
1.	Generalization: In primitive societies, culture is closely related to environment and level of technology.	3.
2.	Inclusive concepts within generalization: Primitive Societies Culture Environment Technology	2.
	Definitive concepts: Plains Indians Northwest Indians Southwest Indians	
3.	Data: Factual data is put into some type of retrieval system. An illustrative model follows:	1.

Illustrative Model of Specific Knowledge

Primitive	Culture				Environment		Technology	
Societies	Food	Clothing	Shelter	Etc.	Topography	Climate	Tools	Methods
Plains Indians								
North-west Indians								
South-west Indians								

Overview of the Processes

In an instructional sequence on the study of primitive societies, a main generalization which one would wish students to discover and verbalize might be, "In primitive societies, culture is closely related to environment and level of technology." An analysis of this generalization quickly reveals that if students are going to be able to state this generalization they must have specific information in relation to the concepts of:

1. Primitive societies
2. Culture of those societies
3. Environment in which they live
4. Technology evident in each society

Using those concepts as a guide, an illustrative model may be constructed which indicates quite specifically what factual knowledge will have to be researched in order to develop them. Two or more primitive societies may be selected for study, culture can be broken down into the elements that constitute culture, environment can be looked at in detail and technology can be considered in relation to its components.

An illustration of how the specific factual data is utilized in the generalizing process of examining relationships and moving from low level to high level abstractions is shown on the next page. As you will notice, the process is one of asking students to analyze specific information, combine elements and move to a higher level abstraction, then combine those abstractions and move to still higher level abstractions.

THE PROCESSES OF GENERALIZING

Indian Group	Food (Concept)		Generalizations →		High Level Abstraction
Plains	The Sioux ate buffalo.	Factual Data	Plains Indians ate buffalo.	The Plains Indians obtained most of their food from their environment.	
Sioux	The Crow ate buffalo.				
	The Blackfoot ate buffalo.	Factual Data	Plains Indians ate uncultivated fruits and vegetables.		
	The Sioux ate wild gooseberries.				
Crow	The Crow ate huckleberries and chokecherries.				
Blackfoot	The Blackfoot ate the root of the Jack-In-The-Pulpit.		The Sioux raised some vegetables.		
	The Sioux raised some corn, squash and beans.				
Northwest Coast	Nootkas ate salmon, salmon eggs, clams, whale and dogfish oil.		Northwest Coast Indians were fish eaters.	The Northwest Coast Indians obtained their food from their environment.	The Indians utilized the plants and animals of their enviornment for food.
Nootka	Salmon, herring, halibut and smelt were eaten by the Salish.				
Salish	Tlingits ate salmon, smelt, haddock and halibut.				
Tlingit	Wild blackberries were eaten by the Nootkas.		Wild berries, roots and tree bark provided food for the Northwest Coast Indians.		
	The Salish ate Oregon grapes, currants and wild onions and the inner bark of maple, alder and hemlock.				
Southwest	Rabbits, deer and elk were used for food by the Hopi.		Southwest Indians used deer and some small animals for food. Much of the Southwest Indians' food was raised or gathered from wild plants.	The Southwest Indians obtained their food by hunting, gathering wild plants or cultivating plants found in their environment.	
Hopi	The Papago hunted deer for food.				
Papago	The Papago made jam, wine and flour from the giant Saguaro cactus.				
Apache	They planted cactus, grass seeds and mesquite bean pods.				
	The Hopi planted beans and corn.				
	The Apache gathered cactus fruits, mescal, mesquite bean pods, yucca fruit, piñon nuts, walnuts, acorns and berries.				

Overview of the Processes

It should be obvious now that the interpretation of data process consists of proceeding through a series of learning experiences which systematically and sequentially provide students with a body of knowledge. This process requires them to translate and organize the information according to conceptual categories and, finally, to analyze relationships within the data and verbalize generalizations which can be logically supported.

Application of Knowledge

To end with the interpretation of data and the statement of generalizations is not enough. As indicated previously, if students are to accommodate to the rapidly changing scientific and social world, they must be able to apply knowledge effectively to new, often unique, situations. Application of knowledge calls for this process.

Planning for the application of knowledge process requires the identification or development of a verifiable event or situation to which previously acquired knowledge may be applied. For example, when studying primitive societies, an environment entirely different from those studied could be described, with the students asked to predict what manner of primitive culture and technology might be found there. The extent to which students are able validly to apply previously learned data can then be verified by examining the primitive society actually existing in the environment described.

Training Program

The training program which you are about to experience will deal in considerable depth with these processes. Primarily social studies will be used as examples or illustrations. However, the strategies are applicable to any subject area, and any grade level. Those who teach in subjects other than social studies will face the added task of mastering this translation. Every effort will be made to assist in the process.

CURRICULUM DEVELOPMENT

Content: This knowledge base presentation and series of small group exercises are designed to develop an understanding of a rationale for curriculum development, and skill in the processes of selecting, sequencing and organizing a structure of knowledge.

Leadership Materials: Curriculum Development, Leadership Notes

Illustrative Models of Generalizations

Participant Materials: A Rationale for Curriculum Development

Classification of Knowledge

Analysis of Generalizations

Selecting a Structure of Knowledge

Building an Illustrative Model

Japan and India

Rationale: To develop an understanding of a rationale for designing curricula that will implement a structure of process applied to a structure of knowledge, and to develop skill in the procedures of selecting, sequencing and organizing knowledge for the design of such curricula

Objective: Following the reading and discussion of a written presentation, A Rationale for Curriculum Development, and a series of exercises, participants will demonstrate their ability to select, sequence and organize a structure of knowledge in a manner designed to facilitate the development of higher level thought processes.

Sequence	Time	Group	Activity
A	20	LG	Rationale for Curriculum Development 1. Refer to A Rationale for Curriculum Development. 2. Indicate to the group that this is a knowledge base exercise. They are not expected to be comfortable at the end of the next 20 minutes. The exercise is designed to serve as a base of theory for subsequent reference. 3. After participants have read the rationale, respond to their questions and concerns.
B	20	SG	Classification of Knowledge 1. Refer to the exercise in Classification of Knowledge. 2. Read the directions aloud and ask the group to identify the two principles. (Refer to page 142, Rationale, I. Hierarchy of Knowledge, if the group has difficulty.) Be certain that entire group has identified the same principles.

3. Ask the group to work as individuals for a few minutes and then to check their classification with another class member.

4. After approximately 10 minutes, ask the group to share responses. The results should be as follows:

I.	Principle:	Change is inevitable
	Generalization:	The original Indian civilization of the Western Hemisphere changed when a new culture was encountered.
	Concepts:	Culture Civilization
	Facts:	The Aztecs and Mayans had developed a number system before the coming of the Spanish. Horses were brought to the New World by the Spanish. Columbus sailed for the Spanish.

Sequence Time Group Activity

II.		
	Principle:	Differences exist in form, class and kind.
	Generalization:	The differences in America's geography, natural resources and population contribute to its industrial strength.
	Concepts:	Natural Resources Population Geography
	Facts:	In 1960 there were 1,255,812 foreign-born Italians in the United States. Mountains cover 13.5 percent of New Mexico. In 1965 the fish catch in Alaska amounted to 492,614,000 pounds.

C 30 SG

Analysis of Generalizations

1. Refer to the exercise in Analysis of Generalizations.
2. Ask the opening question shown there. Generally, response should be as follows:
   a. The first is so specific it could be a direct recall of factual information.

Sequence	Time	Group	Activity

b. The second is specific enough to communicate, yet abstract enough to be inclusive of much data and many situations. Also, it is applicable to most situations in that it includes a statement of condition.

c. The third is so abstract and ambiguous that it really doesn't communicate. The concepts of "strength" and "diversity" are so ambiguous--so inclusive--that they are almost indefinable.

3. The second question follows logically. The second generalization is best because it is manageable, worthwhile and it communicates.
4. On the second part of the exercise sheet, ask participants again to work in pairs to analyze the generalizations as indicated by the directions.
5. While they are working, the blank chart shown on the next page should be put on the board.

Curriculum Development

Sequence Time Group Activity

	+	-
1.		
2.		
3.		
4.		
5.		
6.		
7.		

6. After approximately five minutes, tally how many pluses and minuses each generalization received. Simply ask, "How many gave number 1 a plus?" "How many gave 1 a minus?"
7. Compare the three generalizations that received the most "plus" tallies. Ask, "What do they have in common?"
8. Compare the three generalizations which received the most "minus" tallies. Ask, "What do they have in common?"
9. Ask the group to establish criteria for selecting or deriving generalizations for unit development. (They are based on sufficiently abstract, inclusive concepts. They are based on concepts which are definable. Generalizations

Sequence	Time	Group	Activity
			contain two or more concepts. They typically contain a statement of condition. A generalization has wide applicability.)
D	30	SG	Selection of a Structure of Knowledge 1. Refer to the exercise in Selecting a Structure of Knowledge. 2. Divide small group into subgroups of three members. 3. Read directions. (If necessary, refer back to A Rationale for Curriculum Development.) 4. After approximately 15 minutes, ask groups to share the results. Possible results are as follows: *a. Concepts:* *Languages* *Religions* *Customs* *Climate* *Seasonal Changes (Wet--Arid)* *Equatorial, Severe Winters* *Population* *People Varied* *Generalizations:* *Asia is a land of great geographical and cultural contrasts* *Within Monsoon Asia are to be found differences in climate, culture and land formation.*

Sequence	Time	Group	Activity
			b. *Concepts:* *Old and New Ways Mingled* *Problems Different* *Prospects Exciting* *Rest of World Affected*
			Generalizations: *Asia is undergoing great economic, social and political changes which will affect the rest of the world.* *Greater contact with other cultures is causing changes in Monsoon Asia.*
			c. *Concepts:* *Land of Unity* *Ancient Centers of Civilization*
			Generalizations: *The Monsoon Asia countries are a reflection of their geography and history.*
			5. Write the generalizations on the board.
			6. Apply the criteria developed in the previous exercise to determine if the generalizations are capable of being used for curriculum development. Refine generalizations.
E	30	SG	Building an Illustrative Model
			1. Refer to the exercise in Building an Illustrative Model.

Sequence	Time	Group	Activity
			2. Divide small group into grade level and/or subject area groups. Ask these groups to develop an illustrative model as indicated by directions. 3. Provide transparencies, or construction paper and flow pens. Ask subgroups to be prepared to share their model with entire small group. 4. After approximately 20 minutes, share and refine. The material, Illustrative Models of Generalizations, pages 136-141, are provided for the leader's use. They should not be distributed at this point, but should be utilized as resource material for the leaders in helping the group refine their illustrative models.
F	60	SG	Development of Instructional Unit 1. Explain to participants that one purpose of the program, as stated in the Introduction, is to develop sufficient understanding of, and skill in, the processes of programing an instructional unit. This training will enable the participants to develop instructional units for their own

Sequence	Time	Group	Activity
			teaching situations later. For this reason, an ongoing assignment for the program begins at this point. Participants are to develop an instructional unit as one of the requirements of the course. They may work as individuals, in pairs or in groups.
			2. Give the following directions: a. Units will be developed concurrent with instruction in each step of curriculum development. b. One completed unit will be required from each individual or group on the date specified in the agenda. c. Participants should use the next hour (or evening) to develop a generalization and illustrative model for their instructional unit. d. Use A Rationale for Curriculum Development as a reference.

Sequence	Time	Group	Activity
			e. Reconvene in one hour (or the next session) to discuss generalizations and models. 3. Refer to the instructional unit, Japan and India. Indicate that this is a model of the instructional sequence which will be required. (Depending on available time, require an appropriate quality of production.)
G	30	SG	Evaluation of Generalizations and Illustrative Models 1. Select two volunteers from different grade levels to put their generalizations and illustrative models on the board. 2. Discuss each generalization and model in turn in relation to: a. Is the generalization important enough to teach? b. Is the generalization manageable, that is, Does it communicate (use definable concepts)? Does it properly use a statement of condition? Can it be taught in a reasonable length of time? Does it present a relationship between two or more concepts?

Sequence	Time	Group	Activity
			c. Is it appropriate for the grade level? d. Are its dimensions inclusive enough to teach the generalization, but not so many as to be unwieldy?

ILLUSTRATIVE MODELS OF GENERALIZATIONS

1. Most members of a family have both responsibilities and privileges.

	Work	Fun
Mother		
Father		
Children		

2. As the size of a community changes, the services within the community often change.

	Policemen	Firemen	Etc.
Rural Area			
Suburban Area			
Urban Area			

Illustrative Models of Generalizations

3. The cultural patterns of the Colonies were largely determined by physical environment and cultural patterns brought from the Old World.

	Physical Conditions			Patterns of Living in the Old World					Patterns of Living in the New World				
	Climate	Topography	Natural Resources	Economy	Housing	Religion	Education	Government	Economy	Housing	Religion	Education	Government
New England Colonies													
Middle Colonies													
Southern Colonies													

Illustrative Models of Generalizations

4. Indsutry in an area is largely dependent upon the availability of raw materials, transportation and market.

	Industry	Raw Materials	Transportation	Market
Western Venezuela				
Orinoco Valley				
Santa Catarina, Brazil				

5. The Cold War is essentially the result of two conflicting points of view toward the postwar world, that of the United States and that of the Soviet Union.

	Political Values	Social Values	Economic Values	Relations With Others
United States				
Soviet Union				

Illustrative Models of Generalizations

6. Measures regarded as radical in one generation are often considered moderate in the next.

	Women's Rights	Racial Relations	Etc.
Eighteenth Century America			
Nineteenth Century America			
Twentieth Century America			

7. The novel often reflects the social issues of the times.

	Novel			Society	
	Plot	Setting	Theme	Political Issues	Social Issues
List of selected American novels from significant historical periods					

Illustrative Models of Generalizations

8. The short story usually depicts life as a continuous struggle against a hostile world.

	Character Needs	Barriers to Needs	Solutions
Characters			
Plot			
Setting			
Theme			

9. The physical environment of an area largely determines the life forms in the area.

	Climate	Topography	Plants	Animals
Northern Alaska				
Oregon				
Arizona				

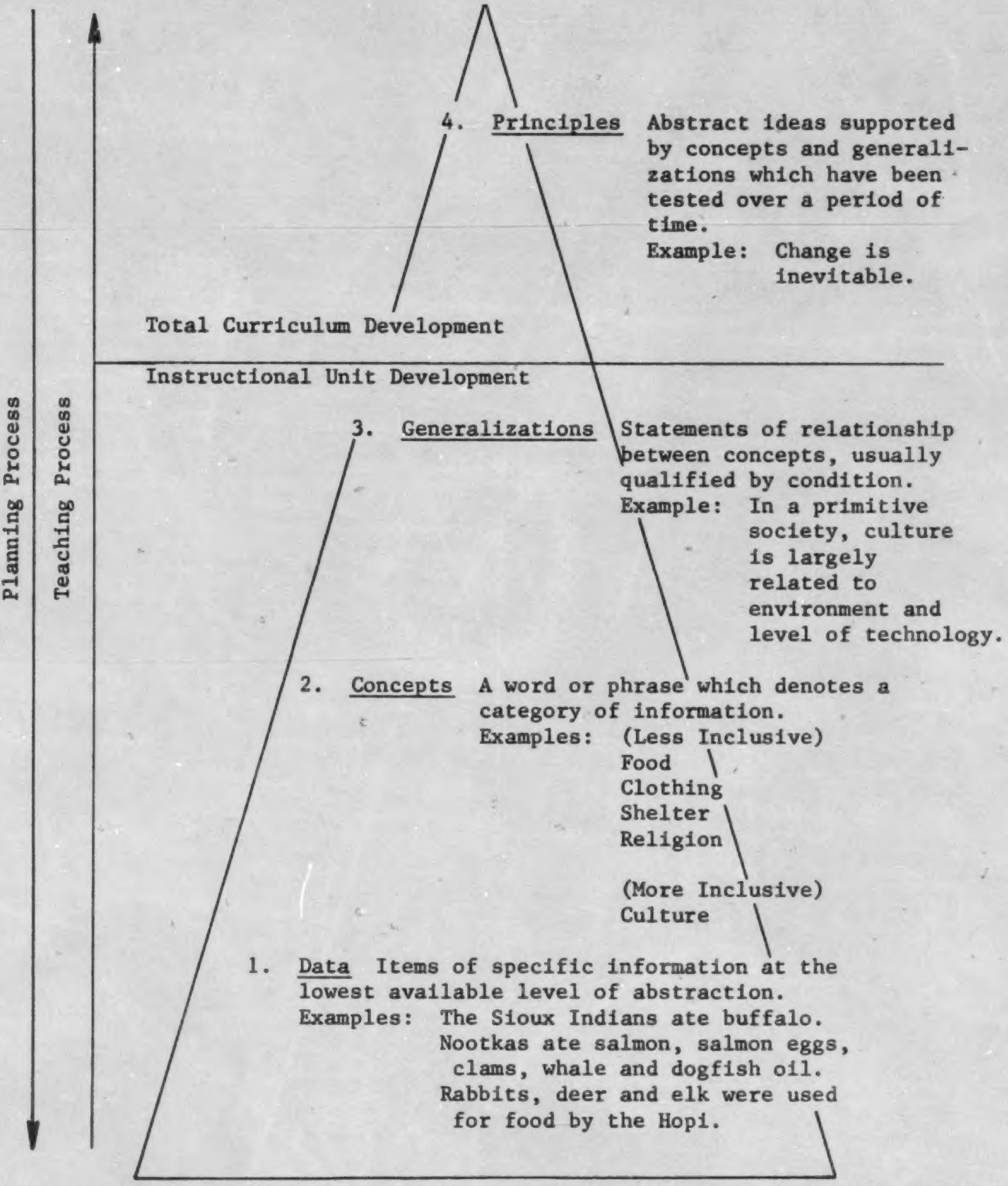
10. The structure of an animal is related to its physical environment.

	Description			Environment	
	Coat	Legs	Ears	Climate	Topography
Polar Bear					
Jack Rabbit					
Deer					
Mountain Goat					

A RATIONALE FOR CURRICULUM DEVELOPMENT

I. Hierarchy of Knowledge

In the development of curricula, it is important to consider four basic levels of knowledge.



4. **Principles** Abstract ideas supported by concepts and generalizations which have been tested over a period of time.
Example: Change is inevitable.

Total Curriculum Development

Instructional Unit Development

3. **Generalizations** Statements of relationship between concepts, usually qualified by condition.
Example: In a primitive society, culture is largely related to environment and level of technology.

2. **Concepts** A word or phrase which denotes a category of information.
Examples: (Less Inclusive)
Food
Clothing
Shelter
Religion

(More Inclusive)
Culture

1. **Data** Items of specific information at the lowest available level of abstraction.
Examples: The Sioux Indians ate buffalo.
Nootkas ate salmon, salmon eggs, clams, whale and dogfish oil.
Rabbits, deer and elk were used for food by the Hopi.

II. Steps in Curriculum Development

A. SELECTION OF CONTENT

1. Determining Scope and Sequence

a. When selecting content for a total curriculum, it is helpful to begin by identifying those principles which will be developed throughout the total program.

For example, in the area of social studies, most content can be organized to develop the principles of:

Interdependence:	The world (man, groups, nature) is interdependent.
Values:	Beliefs are obtained and modified through exploring alternatives.
Cooperation:	Peace and welfare are based on cooperation.
Change:	Change is inevitable.
Differences:	Similarities and differences exist in form, class and kind.

In the area of science, most content can be organized into the following principles:

The universe is composed of matter.
Energy comes from reactions of matter.
Matter and energy are constantly changing.
Understanding matter and energy gives man control of his environment.
All living things change.
All living things interact with their environment.
All living things constantly struggle for energy.
All living things have continued on from generation to generation.

It is helpful to think of principles as strands that thread through the total curriculum, both explicitly and implicitly evident as themes to be developed.

Curriculum directors begin with the principles of a discipline when planning curriculum for a subject area. However, teachers usually begin planning at the generalization level.

b. Following the determination of basic principles, it is necessary to select and sequence basic generalizations which are appropriate to the grade or subject level, as well as the maturity and interest level of children.

For example, following the theme of *interdependence*, a single strand of generalizations might be as follows:

Grade 1: Members of a family depend upon each other.

Grade 2: The community depends upon many different workers.

Grade 3: People living together must make laws and rules for the good of all concerned.

Grade 4: People cannot live or work together without procedures for social interaction.

Grade 5: In a democracy, values are based on the rights of individuals.

Grade 6: The United States depends upon Latin America for many raw materials used in manufacturing.

Grade 7: International trade provides for many associations between people and nations.

Grade 8: No nation in today's world can exist in isolation.

Grade 9: The growth of power in China has affected the foreign policy of most nations.

At this point, a broadening of the scope, as well as checking the stated generalizations for validity, should be accomplished by consulting available sources compiled and presented by authorities in the particular discipline and/or curriculum area. (Both NEA and ASCD are sources of information relative to such publications.)

2. Identifying and Sequencing Specific Content

a. At some point, one must turn to specific subject matter with the task of selecting appropriate content for teaching. For most teachers, the curriculum development task starts at this point. The content that is required to be taught at a particular grade level is set forth in a basic text, a series of texts or a basic curriculum guide. The teacher's responsibility is to select content which is worthy of being taught and to sequence it in a logical and teachable manner.

The task simply becomes one of "digging through the content to identify the principles, generalizations and concepts presented, and to select (or develop) and sequence the generalizations in logical order."

For example, in the brief content statement below, determine the principles and concepts stated; then state generalizations which follow as a natural extension of the ideas.

Since the discovery and settlement of the New World, great changes are taking place today. With rapidly increasing populations, the Latin American countries are striving to make better use of their natural resources in order to improve the living conditions of their people. Like many other countries, our neighbors to the south have become involved in the struggle between democracy and communism. Today, more than ever, Latin America is playing a vital role, not only in Inter-American, but also in world affairs.

Would you agree that the following levels of knowledge are evident in the above statement?

Principles	Concepts
Change:	Rapidly Increasing Populations Natural Resources Improving Conditions
Interdependence:	Democracy Communism Inter-American and World Affairs

Possible Generalizations

Latin America is involved in a struggle to improve living conditions through better use of natural resources.

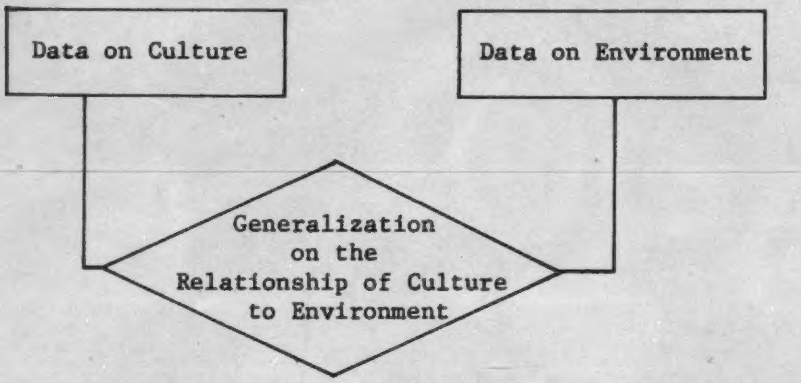
Latin America is involved in a struggle between communism and democracy.

B. BUILDING AN ILLUSTRATIVE MODEL

Recognizing that we wish students to acquire, organize and "interpret" factual data in order to discover and verbalize at the concept and generalization levels of knowledge, it is helpful to analyze generalizations and develop models which illustrate their dimensions.

Definition of Generalizations: A statement of relationships between concepts.

Interpretation of Data refers to examining relationships, grasping implications inherent in those relationships and arriving at generalizations.


Data on Culture
Data on Environment
Generalization on the Relationship of Culture to Environment

This process of interpretation can be applied to any generalization or series of generalizations which is structured in the form of an illustrative model.

Examples

Generalization: In primitive societies, culture is often affected by environment.

Concepts:
Primitive Society
Culture
Environment

Possible Model:

	Culture				Environment	
	Food	Clothing	Shelter	Etc.	Climate	Topography
Society 1						
Society 2						
Society 3						

A Rationale for Curriculum Development

The basic concepts to be developed in this generalization are easily identified as:

Primitive Societies
Culture
Environment

Using contrasting societies, such as woodland, plains and coastal societies, one can construct a model which illustrates the interrelationships between and within concepts and data. This model can serve as the organizing structure for the data which must be obtained in this instructional sequence.

Other examples of illustrative models are as follows:

Generalization: The physical environment of an area largely determines the life forms there.

Concepts:
Physical Environment
Life Forms
Area

Illustrative Model:

	Life Forms		Environment	
	Plants	Animals	Climate	Topography
Northern Alaska				
Oregon				
Arizona				

Generalization: Music often reflects the social and economic issues of the period.

Concepts:
Music
Social Issues
Economic Issues
Period

Illustrative Model:

	Selections of Music	Social Issues	Economic Issues
Periods of Time			

C. SELECTING AND PROGRAMING LEARNING EXPERIENCES

1. Criteria for Selecting Learning Experiences

a. Learning experiences must serve to develop the generalization being taught.

Once the generalization has been determined, each learning experience should be evaluated as to how it is related to the generalization.

Example:

Generalization:	Natural resources and the use made of them influence the standard of living.
Learning Experience 1:	Display a map of Canada on which the wheat growing area of the Prairie Provinces and the potato producing area of Prince Edward Island are shown. Show also a chart of the major exports of Canada. Call attention to the size of the areas producing these crops and the chart showing exports. Ask: Does Canada produce more than she needs at home of some crops? How can you account for the surplus production of some crops and not others? Let children hypothesize as to reasons, e.g.: better soil, fertilization, modern machinery.
Learning Experience 2:	Play several musical selections by Canadian composers. Can the students determine whether the music reflects the Eskimo, Indian, French or English culture?

Learning Experience 3: Have a group prepare a chart showing the literacy rate for Canada and the following Latin American countries: Haiti, Uruguay, Peru, Argentina, Guatemala, Mexico.

Allow pupils to interpret the chart.

Learning Experience 1 is directly related to the generalization as it serves to develop the concepts of natural resources (soil) and standard of living (machinery, technology).

Learning Experience 2 is so remotely related to the stated generalization that it would be of little use in this particular unit.

Learning Experience 3 is pertinent to the generalization because literacy rate and standard of living are obviously related.

b. Learning experiences must serve a justifiable and identifiable function.

Unless the function of a learning experience can be readily identified and justified as being worth the time spent, it is probably a waste of time for both the teacher and the students. Just because it is interesting or fun, is not sufficient. One of the teacher's responsibilities is to foster general pupil interest in worthwhile activity.

c. Each learning experience should provide for multiple kinds of learning.

Each learning experience should contribute to development of more than one function or skill.

Examples:

1. Ask: Who were the people who lived in North America prior to 1492?

   Select from the students' offerings two or three groups with contrasting economics, e.g., hunting and fishing, farming, food gathering.

   Locate these groups on the map and discuss how they differed in their ways of life.

Functions served:
- a. Recall of Knowledge
- b. Map Skills
- c. Relating Geography and Way of Making a Living (seeing relationships or implications)

2. Organize the class into three groups. Each group will have the responsibility for securing information about one culture (Aztec, Maya, Inca). So the groups will have parallel information for comparing and contrasting, all will research the following topics: geography, food, clothing, shelter, tools, education.

Functions served:
- a. Independent Study
- b. Responsibility
- c. Selectivity
- d. Organization

2. Criteria for Programing Learning Experiences

a. The total sequence of learning experience should provide a balance among the four objectives of: (1) Knowledge, (2) Skills, (3) Attitudes, (4) Cognitive Processes.

Example:

Have children draw pictures to show reasons their families came to Oregon. This may be done individually, or children may form groups and each group may make a large picture depicting one reason for parents coming.

Objectives:

- I. Knowledge
  - A. Reasons why parents came to Oregon
- II. Skills
  - A. Expressing ideas visually
  - B. Comparing ideas through discussion
- III. Attitude
  - A. Empathy
  - C. Cooperation
- IV. Cognitive Process
  - A. Concept Formation

While not every lesson will incorporate all four objectives, a series of learning experiences should include all in proportionate amounts. Learning "good content" (knowledge) alone has proved to be inadequate. A mastery of content which may amount to sheer memorization, does not insure the ability to interpret that content, to make inferences or generalizations, to develop a desirable attitude, or the skill to organize data from several sources.

b. Learning experiences should be arranged in sequence so that each experience provides the foundation for the succeeding activity.

Thus, experiences at any age or grade level should proceed from the simple to the complex, from the concrete to the abstract.

c. Learning experiences should increase the students' ability to think, perform and refine the required skills by proceeding in "bite-sized" increments.

Incremental learning means that with each additional learning experience, the student not only learns to deal with new content, skills and attitudes, but is able to refine those he possesses. Powers of discrimination are developed from experience to experience, from year to year. Each succeeding activity should demand a little more effort on the part of the student, while at the same time providing him with a sense of familiarity and success.

d. Learning experiences should provide an opportunity for the pupil to apply old knowledge in new contexts.

The constantly changing pattern and demands of society make it imperative that pupils learn to apply knowledge acquired in one situation to new or altered conditions if they are to function effectively in tomorrow's world.

Example:

After pupils have made a thorough study of the factors involved in their parents' move to Oregon and that of the Oregon pioneers of 1859, they are then given data relative to the topography, climate and modes of transportation available for Alaska. Students are to plan a trip to Alaska, including supplies needed, sleeping and eating accommodations, time of year, time allotted, reasons for going.

e. Learning experiences should provide for systematic rotation of intake of information and means of expressing the new or reorganized concepts.

Means must be provided for children to accumulate data and to share and manipulate the ideas which have been or may be generated.

Example:

Intake:

Make available selected poems such as those listed below from How Shall We Ride Away.*

Llamas
Raindeer
Skis
Kayak
Train

Have the pupils read poems. (intake)

Expression: Discussion of the questions below constitutes expression.

1. What do these poems tell us?
2. What would you expect to see in a place that used ________________ for transportation?
3. Do you know of other types of transportation?

Teachers need to be cognizant of the fact that it usually takes longer to gather data (intake) than it does to express the ideas related to the data. Several days may be spent gathering data prior to one or two days spent in expression. Class discussions are undoubtedly the most common method of expression; however, a variety of methods may be employed, e.g., dramatization, illustration, reporting, original writing.

f. Learning experiences should provide for learning by many diverse means.

Not all people learn in the same manner. Teachers are obligated to provide as many ways of learning as their ingenuity can conceive if each child is to be afforded an equal opportunity to learn. Classes that learn only by reading printed matter are discriminating against the pupils who learn best by auditory methods, or those whose reading ability is so low that they must depend upon pictures, graphs and charts for their sources of information, or those who need a kinesthetic approach.

---

*Russell, Solveig P. How Shall We Ride Away. Chicago: Melmont. 1966.

Examples:

Audiovisual Aids
Periodical Literature
Resource People
General References
Maps
Graphs
Charts
Pictures
Field Trips
Role Playing
Dramatics
Songs
Poetry

CLASSIFICATION OF KNOWLEDGE

Directions: The following words and statements represent two bodies of knowledge. Each can be subsumed under a specific principle. Identify the two principles and indicate on the next page the generalization, concepts and facts that can be listed under each.

The Aztecs and Mayans had developed a number system before the coming of the Spanish.

Culture

The differences in America's geography, natural resources and population contribute to its industrial economy.

Natural resources

Civilization

Change is inevitable

Population

In 1960 there were 1,255,812 foreign-born Italians in the United States.

Geography

Columbus sailed for the Spanish.

The original Indian civilization of the Western Hemisphere changed when a new culture was encountered.

Differences exist in form, class and kind.

Mountains cover 13.5 percent of New Mexico.

In 1965 the fish catch in Alaska amounted to 492,614,000 pounds.

Horses were brought to the New World by the Spanish.

Classification of Knowledge

I. Principle: ____

____

Generalization: ____

____

Concepts: ____

____

____

Facts: ____

____

____

____

II. Principle: ____

____

Generalization: ____

____

Concepts: ____

____

____

Facts: ____

____

____

____

ANALYSIS OF GENERALIZATIONS

1. What are the differences between the following three generalizations?

   a. The steel industry depends upon the availability of coal.

   b. Industry within an area is largely dependent upon the availability of raw materials, transportation and market.

   c. The strength of the United States lies in its diversity.

2. Of the three generalizations above, which one would you consider to be most useful as a basis for a specific instructional unit? Why?

Examine the generalizations below. Place a plus sign (+) before those you consider the best for use in unit development, and a minus sign (-) before the poorest.

1. The policeman is our friend.
2. The physical environment of an area largely determines the life forms within the area.
3. Southwest Indians acquired most of their food from the land.
4. As the size of a community changes, the services within the community often change.
5. The mountain goat's hoof is uniquely constructed to fit his physical environment.
6. The cultural patterns of the Colonies were largely determined by physical environment and cultural patterns brought from the Old World.
7. The novel often reflects the social issues of the times.
8. The values people hold are usually firmly based in religious beliefs.

SELECTING A STRUCTURE OF KNOWLEDGE

Directions:

1. Formulate one or more generalizations which are related directly to the specific content below and which would be worthy instructional goals.
2. Identify and state the concepts within the generalizations.
3. Underline the factual data within the content which underlie these concepts.

MONSOON ASIA[1]

Half of the people of the world live in southern and eastern Asia. Why do so many people live there? How do they make a living? What part do they play in world affairs?

You have probably studied several parts of Asia. You may have read about Southwest Asia, for example. If you studied the eastern portion of the Soviet Union, you found out about Soviet Asia--northern and central Asia. But to most of us the word Asia brings to mind neither Southwest Asia nor Soviet Asia but countries like Japan, China, and India. It means Tokyo, Shanghai, Singapore, Bombay, and other such cities. To most people, Asia means primarily southern and eastern Asia.

We call southern and eastern Asia *Monsoon Asia* because of one of its important climatic features--the seasonal shifts of wind called monsoons. There are some objections to this term, as you will soon see, but we need a short name for the region. "Southern and eastern Asia" is too long to use repeatedly.

Monsoon Asia is a varied region. Its climate is not uniform. Some parts, like Malaya and Indonesia, are equatorial. Others, like Mongolia, have long, hard winters. Some parts are very wet while others are arid. In peoples and cultures, Monsoon Asia is varied, too. There is no "Asian race" or "Asian culture." People, language, religion, and way of life differ not only from one part of Monsoon Asia to another but even from one part of a country to another.

Yet Monsoon Asia does have unity. Here is a very large and immensely populous region that lies south and east of the great, dry heart of Asia and faces the Indian and Pacific oceans. It has had great and ancient centers of civilization and power, of which India and China have been the best known.

---

[1] Jones, Stephen B. and Marion Fisher Murphy. "Monsoon Asia." Geography and World Affairs. Chicago: Rand McNally, 1971, pp. 445-446.

Selecting A Structure of Knowledge

In modern times the civilizations of Monsoon Asia have lagged behind Europe and the United States in economic progress. Now we are seeing great changes in these ancient lands. Old and new ways are meeting and mingling. The problems are difficult. Most of the people are poor and millions are undernourished. Populations continue to grow. Politically there is uncertainty. Dictatorship and democracy and communism and private enterprise contest for these countries. But there are exciting opportunities as well as great problems. When half of the people of the world are in the process of change, the rest of the world had better watch what is happening. Once Monsoon Asia may have been "the languorous East," where time stood still. Today it is very much awake--one of the key areas in world affairs.

BUILDING AN ILLUSTRATIVE MODEL

Directions: State a valid generalization (any of the following may be used), and develop an illustrative model of the concepts within the generalization. (Refer to A Rationale for Curriculum Development, II: B. Building an Illustrative Model, pages 145-147.)

1. Members of a family have both responsibilities and privileges.
2. As the size of a community changes, the services within the community often change.
3. The cultural patterns of the Colonies were largely determined by physical environment and cultural patterns brought from the Old World.
4. Industry in an area is largely dependent upon the availability of raw materials, transportation and market.
5. The Cold War is essentially the result of two conflicting points of view toward the postwar world, that of the United States and that of the Soviet Union.
6. Measures regarded as radical in one generation are often considered moderate in the next.
7. The novel often reflects the social issues of the times.
8. The short story usually depicts life as a continuous struggle against a hostile world.
9. The phsyical environment of an area largely determines the life forms in the area.
10. The structure of an animal is related to its physical environment.

JAPAN AND INDIA

Generalization: Civilizations may change when they encounter a different culture. The changes may vary in degree.

Concepts To Be Developed: Civilizations, Culture

Civilizations	Culture					
	Relations With Others	Religion	Customs (Role of Women) (Social Classes)	Agriculture	Industry	Government
Japan						
India						

I. CONCEPT DIAGNOSIS

Content

India is one of the largest countries in the world. It also has one of the largest populations. Antiquated agricultural methods and religious taboos contribute to a chronic food shortage.

A peninsula, pointing southward into the Indian Ocean, India has great natural resources of all kinds, few of which have been touched.

Although under British rule for many years, India has been slow to adopt Western ways.

Japan is an island country extending over many degrees of latitude; thus, it possesses a wide variety of climatic conditions.

After years of enforced isolation, Japan consented to open its ports to Western trade, following Commodore Perry's visit in 1853.

Learning Experiences

Display a map of the world. Ask students to locate Japan and India.

Ask, "What do you know about Japan and India?"

After a sufficient number of items have been listed, ask, "Do you see any items in our list which are related?"

> NOTE: Some pupil is likely to suggest that two groups can be formed: Japan, India. If a pupil does not call attention to the fact that some items are stated so as to pertain to both countries, e.g., "They have many different ways of wearing their clothing," ask, "Could you group this statement in this way as it is written?"

After grouping has been completed ask, "What title can we give to Group A, Group B, etc.?"

Keep list for future reference.

Functions

A. Knowledge
  1. For pupils:
    a. Dimensions of the unit
  2. For teacher:
    a. Pupil background
    b. Degree of class participation
    c. Quality of pupil responses

B. Skills
  1. Verbalizing ideas
  2. Grouping related items
  3. Selecting main ideas

C. Attitude
  1. Respecting the rights of others to present their ideas

D. Cognitive Process
  1. Concept diagnosis

II. INTERPRETATION OF DATA

Content	Learning Experiences	Functions
	Refer to a physical features map of Japan. Ask, "What information can you gain from the maps about Japan?" Select from pupils' offerings those items pertaining to climate and topography. Have pupils compare mountainous area with nonmountainous. Ask them what effect the amount of mountains might have on a country. Repeat with India.	A. Knowledge 1. Location of Japan and India 2. Physical features of the two countries 3. Probably climatic conditions due to latitude and position in relation to oceans B. Skills 1. Map reading C. Cognitive Process 1. Concept diagnosis 2. Applying knowledge of weather

II. INTERPRETATION OF DATA

Content

Learning Experiences

Organize the class into two groups. Each group will be responsible for securing data about one of the cultures.

Have pupils keep notes as individuals within each group.

The following study questions should be used to guide the research. The teacher may either provide the questions, or obtain them from the pupils with a question such as, "In order to understand a country, what topics would we need to study?" Select those needed to arrive at the generalization.

1. What is their religion like?
2. What customs do they have?
3. What is agriculture like in their country?
4. What industries do they have?
5. How are they governed?
6. What have been their relations with other countries?

The teacher should stress that an historical approach will be used in studying these topics. (This approach is necessary to show the degree of change.)

Function

A. Knowledge
    1. Topics to be included in the study

B. Skills
    1. Formulating questions

C. Attitude
    1. Cooperation

D. Cognitive Process
    1. Translation

II. INTERPRETATION OF DATA

Content	Learning Experiences	Functions
	Pupils will perform individual research. However, all audiovisual aids and resource people will be presented to and interpreted by the entire class.	A. Knowledge 1. Data as related to dimensions of study B. Skills 1. Locating information 2. Notetaking 3. Organizing information C. Attitude 1. Independence in acquiring information D. Cognitive Process 1. Translation 2. Interpretation of data
Shintoism, the main religion of Japan, is nature worship and emphasized emperor worship. Educationally, the Shinto ideal is anything but intellectual. The superior man is more interested in action than contemplation. He is opposed to the detachment of the scholar. Christianity is becoming an increasingly common religion in Japan.	Read The Golden Crane[1] to the class. After reading ask: 1. What happens in the story? 2. How did Toshi feel about the Golden Crane? Why? 3. How did Oji-san feel about the bird? 4. What do you think is the meaning of the story?	A. Knowledge 1. Facts of The Golden Crane B. Skills 1. Listening 2. Relating facts C. Attitude 1. Behavior differs among individuals due to their values D. Cognitive Process 1. Interpretation of data

---

[1] Yamaguchi, Thor. The Golden Crane. New York: Holt, Rinehart & Winston, 1967.

II. INTERPRETATION OF DATA

Content

Learning Experiences

Show the filmstrip Religions.[2] Interpret with questions such as:

1. What religions are found in Japan?
2. How are the people affected by these religions?
3. What changes have occurred in religion in Japan during its history?
4. What generalization can you make about Japanese religions?

Functions

A. Knowledge
   1. Religions existing in Japan
   2. Unique features of these religions

B. Skills
   1. Listening
   2. Observing
   3. Generalizing

C. Attitude
   1. Different religions may exist harmoniously within the same country and person

D. Cognitive Process
   1. Interpretation of data

---

[2] Eye Gate House, Inc.

II. INTERPRETATION OF DATA

Content

Hinduism is a supporter of the caste system.

Mohammedanism encouraged feudalism.

The religious teachings within a country may influence the development of its society.

Learning Experiences

Show the film The Hindu World.[3] Follow with:

1. What did the film tell about Hinduism?
2. From responses, select those pertaining to devotion in time and effort of people, discipline required, caste system, reincarnation. Ask what influence each of these aspects of Hinduism has upon its adherents.
3. Ask, "What generalization can you make about Hinduism?"
4. Compare Hinduism with Japanese religions (particularly Shintoism) and their effects on the people.

Functions

A. Knowledge
   1. Hinduism has several aspects (yogis)
   2. An extremely disciplined religion
   3. The effects of the Hindu religion upon its adherents

B. Skills
   1. Observation
   2. Listening

C. Attitude
   1. Devotion to one's religion sets a pattern for a way of life

D. Cognitive Process
   1. Interpretation of data

---

[3] Coronet Films.

II. INTERPRETATION OF DATA

Content

Learning Experiences

Allow several periods for pupils to gather data for dimensions of information display. After ascertaining that all have found some information on customs (much can be gleaned as secondary information from films already shown), invite a resource speaker to speak on customs in Japan. (The same may be done with India if such a person is available.) Beforehand, alert resource person to discuss the role of women in the society and social classes and any changes which have occurred in recent times.

Following resource speaker, ask:

1. What information about customs did our resource speaker give us?
2. Select responses relating to social classes, women's role. What effect does ________ have on Japanese life?
3. What changes have occurred in women's positions? In social classes?

   NOTE: At this point do not pursue the reasons these changes have occurred.

Functions

A. Knowledge
   1. Customs of Japan (and/or India as seen by a native of the country)

B. Skills
   1. Listening
   2. Asking pertinent questions

C. Attitude
   1. Making others feel comfortable by our attitude toward them
   2. Acceptance of another's customs

D. Cognitive Process
   1. Interpretation of data

II. INTERPRETATION OF DATA

Content

Both Japan and India have burgeoning populations.

Only 16 percent of Japan's land is arable; therefore, they devised terracing to increase land area.

While Japan has rapidly adapted Western technology to her agriculture, including fertilizers and machinery, India basically retains the methods which have been practiced for centuries.

Learning Experiences

Show film Japan, Harvesting the Land and the Sea.[4]

Let pupils put information into note form for later use on information display. Teacher may find it worthwhile to discuss film to the extent of facts obtained:

Examples:

- Two tons of rice produced per acre
- Highest productivity per acre in the world
- Experts in plant genetics

Functions

A. Knowledge
  1. Amount of arable land
  2. Production from land and sea
  3. Methods utilized

B. Skills
  1. Observation
  2. Listening
  3. Notetaking
  4. Ascertaining pertinent information
  5. Recording information

C. Attitude
  1. Japan has contributed to the improvement of agricultural methods

D. Cognitive Process
  1. Concept diagnosis
  2. Translation of information

---

[4] Encyclopaedia Britannica Films.

II. INTERPRETATION OF DATA

Content

Learning Experiences

Provide pupils with copies of "The Village Level: An Introduction to Green Manuring in Rural India."[5] Do not give page 8 to pupils at this time.

Following reading, ask:

1. What was the purpose of the Rural Development Pilot Project?
2. What problems were encountered?
3. Why were these problems encountered?
4. How was the team able to surmount the problem?
5. What conclusions about improving farming practices in India can you draw from this article?

Distribute page 8 to pupils to compare with their analysis of the factors involved in the successful conclusion of the experiment with that of the author, Rudra Datt Singh.

Functions

A. Knowledge
   1. Problems of food supply vs. population in India
   2. Traditions and their influence on Indian villages
   3. Results of experiment

B. Skills
   1. Translation of reading matter

C. Attitude
   1. The traditions existing in a culture are important to its people and must be handled with respect

D. Cognitive Process
   1. Concept diagnosis
   2. Interpretation of data

---

[5] Spicer, Edward H. Human Relations in Technological Change. New York: John Wiley, 1952.

II. INTERPRETATION OF DATA

Content

Learning Experiences

Make arrangements with a variety store, a gift shop, an electronic establishment, a department store or supermarket, a furniture store and a lumberyard for visits by groups. (If the class is large, it may be well to select representatives from the Japan and India groups to collect data.)

In advance, have pupils prepare charts similar to the following. Let pupils sample shelves or counters for products.

Product	Price

Managers of business establishments often provide additional information: other merchandise available in their catalogs, how it is obtained, why foreign-produced goods are bought rather than American made, customers' reaction to products.

Upon returning to classroom, pupils may transfer data to charts.

Follow up each visit with thank you letters.

Functions

A. Knowledge
   1. Quantity and price of items produced in India and Japan to be found in the community

B. Skills
   1. Observation
   2. Recording data

C. Attitude
   1. Consideration for the property of others
   2. Expressing appreciation for services

D. Cognitive Process
   1. Concept formation
   2. Translation

II. INTERPRETATION OF DATA

Content

Learning Experiences

Interpretation of Information Display:

Upon completion of the information display, disucss the two civilizations, their differences, and the significance of these differences.

Suggested question sequence:

1. What do you notice about religion, customs, agriculture, industry, etc. in Japan and India?
2. How are these civilizations alike in religion, customs, etc.?
3. What differences do you see in religion, customs, etc., between India and Japan?
4. How do you account for these differences?

Final question:

Can you make a generalization that would apply to both Japan and India and that would include all these ideas (responses listed from Question 4)?

Functions

A. Knowledge
   1. Facts as listed on information display
   2. Generalizations made from the data

B. Skills
   1. Reading points
   2. Comparing, contrasting
   3. Generalizing

C. Attitude
   1. Acceptance of change as a basic principle of life

D. Cognitive Process
   1. Interpretation of data

III. APPLICATION OF KNOWLEDGE

Content

Learning Experiences

Fill in the dimensions of an information display for Iraq with the following information:

Relations With Others

Written history dates back as far as 3,000 B.C.

After about 500 B.C. Near East nations dominated the area.

In 1638, the country was conquered by the Ottoman Turks.

From World War I to 1932 Britain controlled the country.

In 1932, it became an independent nation.

In 1951, western petroleum companies signed an agreement giving the government half the profits from oil produced within the country.

Functions

A. Knowledge
  1. Facts presented on information display and map

B. Skills
  1. Making inferences and predictions
  2. Verbalizing ideas

C. Attitude
  1. A cause and effect relationship is a basic principle of life

D. Cognitive Process
  1. Application of knowledge

III. APPLICATION OF KNOWLEDGE

Content	Learning Experiences	Functions

Government

This country has one of the longest histories of any country in the world.

After Mohammed, it was ruled by caliphs who acted as spiritual and civil leaders. From the 1500's until 1924, it was dominated by the Ottoman (Turkish) caliphate.

Agriculture

Sheep, camels and horses were raised. The animals were used for food, transportation, clothing and trade. Farmers used hand tools and wooden plows. Many dates and a great deal of barley were grown.

Customs

Many of the people spent their lives as wandering herdsmen, herding sheep, goats, camels and other livestock. Leaders of the tribesmen sometimes had great wealth and as many as four wives.

Houses of the people who did not wander were flatroofed and made of sundried mud brick.

The men wore long white shirts reaching to the ankles. Women's clothing consisted of long, woolen cloaks and sometimes veils over their faces.

III. APPLICATION OF KNOWLEDGE

Content

Learning Experiences

Functions

Religion

At first these people worshiped nature and idols. Their chief gods were Allah, Uzza and Manot. Mohammed became convinced that there was only one God and that he revealed himself in the Bible. Mohammed said that God called him as his prophet to destroy idolatry and to bring the people to the worship of one God. He preached the punishment of unbelievers and gathered an army to force others to accept his beliefs. Followers of this religion became known as Moslems. They honored learning and developed arts. Academies and universities were established.

Elements of other cultures were adopted by the Moslems as part of their religion.

Industry

Craftsmen produced fine jewelry, glassware and textiles. Glazed tiles painted with intricate designs were used for mosques, their houses of worship.

III. APPLICATION OF KNOWLEDGE

Content

Learning Experiences

Functions

Provide pupils with the information display and a physical features map, including latitude but no named locations. (Chart and map may be of desk size or wall size, depending upon the teacher's preference.)

Give pupils an opportunity to read data on the chart and map. Then proceed in a manner similar to that below.

1. What would you expect to find if you went to this country today?
2. Let's look more closely at your predictions for (agriculture). Why would you expect it to be this way?
3. If the (farming) is done in this way, what effect will it have?
4. Repeat Questions 2 and 3 for other items which may be extended.
5. Based upon the predictions we've given, what generalization can be made about this country?
6. Allow pupils to do research to verify or disprove their predictions.

Evaluation

Content

Learning Experiences

Display listing from opener.

Ask pupils to read list. Allow pupils to mark out any completely erroneous statements, and to make modifications necessary to insure the accuracy of other items listed.

Functions

A. Knowledge
  1. Facts, concepts and generalizations gained from the study of the unit

B. Skills
  1. Evaluating accuracy of statements in light of present knowledge

C. Attitude
  1. As more information is obtained, we may modify or discard previous concepts

D. Cognitive Process
  1. Interpretation of data

SENSITIVITY TO QUESTIONS

Content: Small group involvement is designed as a sensitivity experience, an inductive sequence on constructing, analyzing and using questions.

Leadership Materials: Sensitivity to Questions, Leadership Notes

Participant Materials: Questioning

Sensitivity to Questions

Rationale: To sensitize participants to thought patterns and the emotional elements of different styles of questions

To provide an opportunity for continued group interaction for promotion of an open relationship and active learning

Objective: Following this sensitivity experience, participants will demonstrate:

1. Understanding of the importance of designing questions to fit a specific intention by writing questions which logically fit their purpose
2. An open and active learning process by active discussion in the exercise

This particular experience, placed at this point early in the agenda, has been found to have two very positive effects on subsequent activities:

1. It sensitizes participants to the need for improving process skills. They become immediately aware of new and very worthwhile theories and techniques.
2. It quickly sets the stage for the instructional format of the workshop. It is completely inductive in nature, with participants very actively involved in the learning process.

This activity is divided into five parts. Where time is short, Parts I, IV and V, while very worthwhile, may be all or partially eliminated without seriously detracting from the results of the activity. Parts II and III are absolutely essential to the success of the activity.

I. Ask participants to write two or more test questions which they have recently asked of pupils, or ones that immediately come to mind. Indicate that they will not share these with others; they will put them aside to analyze later.

II. Analyzing Questions

The sequence of questions below is designed to operate inductively for the purpose of sensitizing participants to the emotional and intellectual elements of different kinds of questions. Avoid lecturing. Let the material carry the load of instruction.

Sensitivity to Questions

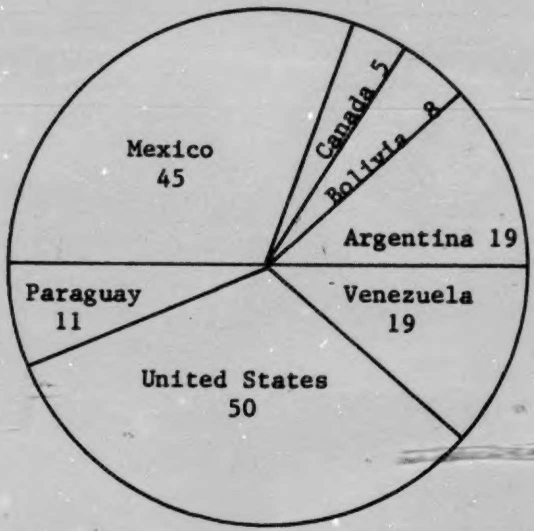
Sequence	Time	Group	Activity
A	10	SG	Memory Questions (Do not indicate to the participants what type of question you are asking.) 1. Ask participants to respond in writing to the following questions: What is the largest city in (Oregon) ? What are the three tallest mountains in ________? What are the three most important industries in _______, in order of their economic importance? 2. Share answers. 3. Ask participants to analyze their feelings in relation to this type of question. Usual responses are: *Threat* *Defensiveness* *Intimidation* 4. Ask, "Is this an important kind of question?" *Expect divergency in response. Some will feel this type of question is important, others will not. At this point, simply ask for the basis of their opinion.* 5. Ask, "When would you use this type of question?"

Sensitivity to Questions

Sequence	Time	Group	Activity
			6. Ask, "What sort of mental operation does this question call for?" Usual responses are: *Memorization* *Recall*
B	15	SG	Translation Questions 1. Refer to Sensitivity to Questions in the participant materials. Ask participants to respond in writing to the following question: By use of a bar graph, show the gross national products of the countries portrayed on the circle graph shown on the next page. 2. Share answers. 3. Ask participants to analyze their feelings in relation to this type of question. 4. Ask, "What did you need to do to answer this question?" *Put information into another form* 5. Ask, "When would you use this type of question?"

Sequence	Time	Group	Activity

Population[1] Per Square Mile of Selected Countries



6. Ask, "What mental operations are involved in answering a question of this type?"

Comprehension of data

Put data into another form

C 10 SG Interpretation Question

1. Refer to the second chart in Sensitivity to Questions. Ask participants to respond in writing to the following question:

What relationships do you see in the Interpretation Chart?

---

[1] Hanna, Paul R., Clyde F. Kohn and Robert A. Lively. "Area and Population." In the Americas. Chicago: Scott, Foresman, 1962, p. 416.

Sensitivity to Questions

Sequence Time Group Activity

2. Share answers.

3. Ask, "When would you use this type of question?"

Interpretation Chart[2]

Nation	Percent Employed in Agriculture	Average Per Capita Income	Percent Literacy	People Per Doctor	Life Span
Argentina	25	$ 460	92	764	64
Bolivia	64	90	45	3,850	49
Canada	12	1,269	97	953	69
Mexico	58	220	79	1,896	50
Paraguay	54	140	69	1,911	50
United States	8	2,166	97	795	70
Venezuela	41	700	47	1,663	50

4. Ask, "What mental operations are involved in answering this type of question?"

   Comprehension of Data

   Translation of data into a form meaningful to the individual

   Relating of facts

   Generalizing of either low or high level

5. Ask, "What emotional reaction did you experience?"

   Excited

   Involved

---

[2] Ibid. pp. 416-419.

Sensitivity to Questions

Sequence	Time	Group	Activity
D	15	SG	Application Question

1. Direct the participants to take a few minutes and write what they think of in relation to the question, "What would happen if all the food that man needed was reduced to just one pill a day?"

2. Ask participants to share answers.

   Some answers will be straight cause and effect predictions; others may be prediction, explanation and some will be high level predictions with a chain of events to support them. You may wish to point out these variations.

3. Ask participants to analyze their feelings in being asked to respond to this type of question, not by reacting to the content of the question, but to the type.

   Someone will surely say, "I was frustrated because I think such a situation would be horrible!" He is reacting to the content, not the type of question.

   Usual responses to the divergent question are:

   Lack of threat

   Lack of pressure

   Openness: anyone can respond

Sequence	Time	Group	Activity
			4. Ask, "When would you use this type of question?" Usual responses are: *Opening a unit* *Developing creativity and imagination* *Closing a unit, application of knowledge to a new situation* 5. Ask, "What sort of mental operation or thinking process does this type of question call for?" Usual responses are: *Calls for more involvement, more digging into the question* *Asks to be more critical* *More difficult to answer than previous questions* 6. Ask, "What feelings did you have while answering this question?" *Challenged* *Frustrated due to need to critically analyze statements*
E	10	SG	Analysis Question 1. Ask participants to respond in writing to the following question:

Sensitivity to Questions

Sequence	Time	Group	Activity
			A student has stated that the development of hydroelectric power would increase the standard of living in Venezuela twofold. What assumptions underlie the student's statement? 2. Share answers. 3. Ask, "When would you use this type of question?" 4. Ask, "What mental operations are involved in asking this type of question?"
F	15	SG	Synthesis Question 1. Ask participants to respond in writing to the following question: Write three lines to complete the following: I saw spring arrive in all its green splendor. 2. Share completed verse. 3. Analyze feelings in responding to this type of question. Possible responses include: *Fun* *Challenged* *Creative*

Sensitivity to Questions

Sequence	Time	Group	Activity
			4. Ask, "What did you have to do mentally in order to answer the question?"
G	20	SG	Evaluative Questions 1. Ask participants to respond in writing to the following question: Who was the most effective president, Truman or Eisenhower, and why? 2. Do not share answers. 3. Analyze feelings in response to this type question. Recognize that several individuals will be not only frustrated with this question, but downright irritated. 4. Ask, "Would you ever ask questions such as the following?" "Would you rather be a North American cowboy or a South American Gaucho? Why?" "Which of the two characters in the story would you rather be? Why?" 5. Ask, "What is the difference between these questions and the Truman-Eisenhower question?" *A matter of emotional content, no intellectual operation*

Sensitivity to Questions

Sequence Time Group Activity

6. Ask, "What are some personal values that most of us share?"

   Usual responses are:

   All men created equal
   Do unto others...etc....
   Honesty
   Etc.

7. Ask, "How did we obtain our values?"

   Usual responses are:

   Parents
   Church
   School
   Experience

8. "Let's go back and analyze the initial question (Truman vs. Eisenhower) again." (Restate the question.)

   "What mental operation is called for here?"

   Analyze two alternatives, develop a set of criteria for choosing, and support the choice.

9. Point out that we do not teach values, but that we can give children experiences in the process of "valuing," choosing between alternatives, based on self-determined criteria.

Sensitivity to Questions

III. Writing Questions

The following activity is designed to sensitize individuals to the thought processes involved in writing questions.

Sequence	Time	Group	Activity
A	30	SG	Writing Questions 1. Refer to Questioning in the participant materials and briefly review. 2. Ask participants to construct a question of each type. 3. When most of the participants have finished, ask if someone will take the risk of reading his questions. Allow the group to analyze them to determine if the questions fit the category type. Let three or four others share theirs.

IV. Role-Playing Questions

If time permits, the following sequence is helpful in demonstrating the need for a flow of questions from facts to operations upon facts.

Sequence	Time	Group	Activity
A	45	SG	Role Playing 1. Divide participants into four groups. 2. Assign the same topic to all four groups. *The problem of grading has been found to work well.*

Sequence	Time	Group	Activity
			3. Assign task: "Be prepared to come back and lead a discussion with the total group using questions of only one of the types listed."
			4. Conduct discussions. *Participants will recognize, through frustration in some cases, that effective questioning cannot be achieved by the use of only one type.*
			5. Move back to the group and develop a question strategy for discussion of the problem of grading using various levels of questions. *By discussing the process which they went through in items 3 and 4 above, participants should gain considerable insight into what constitutes a logical question sequence.*

V. Now, go back to the test questions that participants were asked to write in Section I above. Ask participants to analyze them in relation to the level of knowledge and mental operation called for. If time permits, ask participants to rewrite questions using different category types.

QUESTIONING

1. Memory Questions: Calls for facts

   a. What is the largest city in Oregon?

   b. What are the three highest mountains in North America?

   c. What are five natural resources of Argentina?

   What is the name for...?

   Who is...?

   Where is the...?

   Describe....

   What is a...?

2. Translation Questions: Calls for changing a communication to a parallel form

   a. In your own words, tell what the graph shows.

   b. Draw a poster depicting the meaning of the idea of a cold war.

   c. Plan and present a sociodrama illustrating the work of Simon Bolivar.

3. Interpretation Questions: Calls for relating facts, generalizations, definitions, values and skills

   a. Is the standard of living in Venezuela the same or different from that of Uruguay?

   b. What generalization(s) can you make about Japan and India from the information we have?

   c. What inference can you make regarding this nation's industry by looking at this list of exports?

4. Application Questions: Calls for transferring knowledge to new or different situations

   a. We've studied pollution, now let's design a program to control pollution in our school neighborhood.

   b. If you were to visit this country, what changes would you expect to find?

   c. What would happen if irrigation water were available to this desert area?

5. Analysis Questions: Calls for the solutions of problems in the light of conscious knowledge of the parts and processes of reasoning

   a. What conditions must exist before a nation can practice democracy?

   b. Read the following article. Which quotations are taken out of context? What effect do the out-of-context quotations have?

   c. Analyze the reasoning in the cartoon.

6. Synthesis Questions: Calls for creative thinking; classroom atmosphere, rather than the questions asked, is the key to synthesis thinking

   a. How would history have changed if the South had won the Civil War?

   b. Develop a questioning strategy which incorporates the basic techniques espoused by Taba and Suchman.

   c. Write a story using the following sentence as the beginning: When Bud turned the corner....

7. Evaluative Questions: Calls for making judgments through use of implicit or explicit criteria

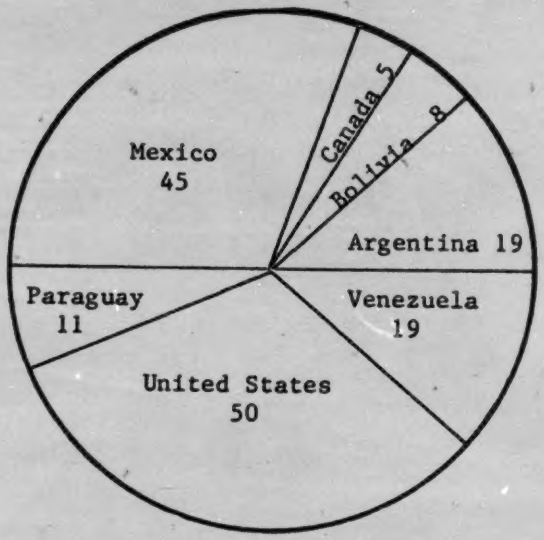
   a. Is the information in this magazine article accurate? Support your answer.

   b. We set up these standards for a good class discussion. Evaluate today's discussion against these criteria.

   c. Should grading systems be abolished in public education?

POPULATION[1] PER SQUARE MILE

OF SELECTED COUNTRIES



INTERPRETATION CHART[2]

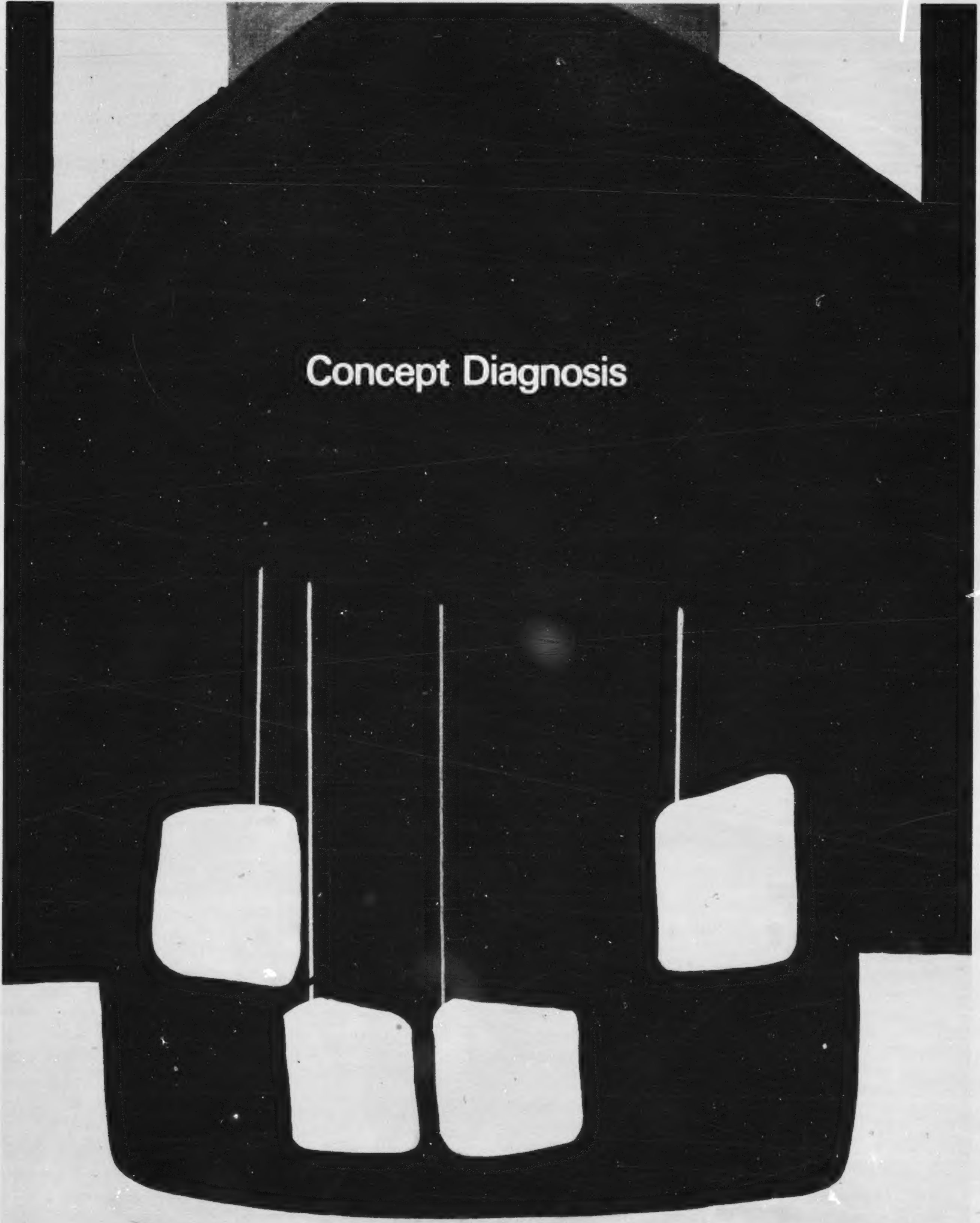
Nation	Percent Employed in Agriculture	Average per Capita Income	Percent Literacy	People per Doctor	Life Span
Argentina	25	$ 460	92	764	64
Bolivia	64	90	45	3,850	49
Canada	12	1,269	97	953	69
Mexico	58	220	79	1,896	50
Paraguay	54	140	69	1,911	50
United States	8	2,166	97	795	70
Venezuela	41	700	47	1,663	50

---

[1] Hanna, Paul R., Clyde F. Kohn and Robert A. Lively. "Area and Population." In the Americas. Chicago: Scott, Foresman, 1962, pp. 416-419.

[2] Ibid.

Concept Diagnosis



SENSITIVITY TO CONCEPT DIAGNOSIS

Content: With the instructor as teacher and the participants as students, the process of concept diagnosis is role played to form a sensitivity experience.

Leadership Materials: Sensitivity to Concept Diagnosis, Leadership Notes

Rationale: To provide a sensitivity experience exploring the intellectual and emotional processes involved in concept diagnosis

Objective: During the process of role playing an experience in concept diagnosis, participants will demonstrate their emotional involvement in the process by actively portraying their assigned role with demonstrated feeling. Following the activity they will further demonstrate both intellectual and emotional involvement by personally recalling and stating their feelings and understandings.

SENSITIVITY TO CONCEPT DIAGNOSIS

Leadership Notes

The purpose of this activity is to sensitize participants to the intellectual and emotional processes involved in concept diagnosis. Previous experience has demonstrated that an effective way of accomplishing this goal is to role play the process with each participant personally involved in the activity.

Sequence	Time	Group	Activity
A	60	SG	Role Play Concept Diagnosis

1. Indicate to participants that the purpose of this activity is to role play concept diagnosis, that the role they are to play is one of a student responding rationally to the question which you are about to ask. Indicate, however, that they need not be concerned that their responses be child-like. They may respond on their own level.
2. Since the curriculum development theme of comparing and contrasting Japan and India runs through the entire training program--and since one instructional goal is to demonstrate the application of each of the cognitive processes to this curriculum theme--ask the following

Sequence	Time	Group	Activity
			as the opening question:

What do you know about Japan and India?

3. Work through the entire process of listing, grouping and labeling.

Provide opportunities to:

Map the conceptual field: "Are there any areas that we have left out of our listing?"

Clarify content: "What do you mean by strange customs?"

Summarize content: "Could you put that in one sentence?"

Group elements on multiple bases: "You may put an element in more than one group if you like."

Ask for criteria for grouping: "Why do you feel that they belong together?"

Refine labels: "Do all of the elements grouped here fit this label?"

Regrouping: "Would it be helpful, or more logical, to change any of our groupings?"

Sequence	Time	Group	Activity
B	15	SG	Analyze Process

1. Following the role playing activity, conduct the following question sequence for the purpose of analyzing both the intellectual and emotional processes which they experienced.

Sensitivity to Concept Diagnosis

Sequence **Time** **Group** **Activity**

a. What did we find out from this exploration of our knowledge of Japan and India?

Gaps in knowledge

Degree of class participation

Ability to verbalize ideas

b. How did you feel while going through this process?

Most participants feel quite comfortable during the listing process--but often report a degree of frustration and irritation with the grouping and labeling processes.

c. What intellectual process is called for in listing?

Recall of previously learned data

d. How did you feel when listing?

Usual response is, quite comfortable

e. What intellectual process is called for in grouping?

Ability to perceive relationships and organize data on a logical basis

f. How did you feel when grouping?

Many will report frustration.

g. How do you account for these differences?

The first requires a low level memory response and the second requires a higher level thought process of perceiving relationships and verbalizing the basis for them.

Sensitivity to Concept Diagnosis

Sequence	Time	Group	Activity
			2. Call for any questions or concerns. Discuss them if it seems appropriate. However, do indicate that the process will subsequently be broken down into its component parts and analyzed in considerable detail.

PROCESSES IN CONCEPT DIAGNOSIS

Content: This knowledge base presentation for the large group gives the theory, purpose and techniques for implementing the processes in concept diagnosis.

Leadership Materials: Processes in Concept Diagnosis, Leadership Notes

Participant Materials: Processes in Concept Diagnosis

Rationale: To provide a knowledge base of theory and techniques to which subsequent activities will be related

Objective: Following a large group, formal presentation on the theory, purposes and techniques of concept diagnosis, participants will demonstrate an understanding of the processes and techniques presented by subsequently completing the activities.

The purpose of this presentation is to provide a knowledge base for subsequent simulation and laboratory experiences. It may be conducted in one of two ways.

I. Illustrated Lecture

II. Reading of Processes in Concept Diagnosis

Sequence	Time	Group	Activity
I	30	LG	**Illustrated Lecture** For those leaders who feel quite secure with the content and processes of this instructional program, it is recommended they develop their own presentation. They should be careful to incorporate the basic theory techniques in the paper, *Processes in Concept Diagnosis*.
II	30	LG	**Reading of Processes in Concept Diagnosis** Refer to the paper, *Processes in Concept Diagnosis*, and ask the participants to read it.

PROCESSES IN CONCEPT DIAGNOSIS

This paper will (a) review the theory which underlies the process of concept diagnosis, (b) indicate specifically what purposes are accomplished by using this process and (c) present in detail the teaching strategies which are called for in the implementation of the process.

Theory

First of all, one should review what a concept is. In, Overview of the Processes, a concept was defined as, "A word or phrase which denotes a category of information." Examples would be *democracy, communism, primitive society, literature, transportation, vehicles powered by an internal combustion engine,* or any word or phrase that designates a body of information with common properties. Individuals acquire and refine the concepts they use through a constant process of experiencing new data, with the concepts becoming more abstract and inclusive as new data is added. A child may use the term *transportation* when his conceptual field only encompasses cars, trucks and buses. However, at a more mature level, he will be able to include a variety of land vehicles, air vehicles and water vehicles, when called upon to discriminate elements categorized as *transportation.*

Also, it is important to realize that the complex of elements which is included within an expressed concept is unique to the individual expressing it. Each person is a product of a unique set of experiences, and when an idea is communicated the vocabulary and concepts used are based upon this set of unique experiences. It is important, therefore, in any dialogue to check one's perception of the understanding the other person has of a particular concept.

Processes In Concept Diagnosis

An example comes to mind of a sixth grade student who was unable to accept stored water as a natural resource. Asking for clarification resulted in the discovery that her concept of natural resources could only include water which was flowing out of the ground.

Clearly, the classroom teacher needs a working awareness of how his students conceptualize the components of a given topic or problem. This need for mapping the students' conceptual field, then, is the reason for using concept diagnosis as an opening activity for an instructional unit.

Purposes

The process of concept diagnosis is designed to accomplish three objectives.

1. To obtain diagnostic data prior to beginning an instructional sequence. Information which can be obtained by using this process is:
    - a. Background knowledge that students possess of the subject area to be studied
    - b. Gaps in knowledge, and misconceptions that need to be corrected
    - c. Ability to perceive relationships within a body of information
    - d. Ability to organize ideas on a logical basis
    - e. Ability and/or willingness to verbalize ideas in a manner which communicates accurately
    - f. Ability to analyze other people's ideas and use them in developing one's own
    - g. Ability to use group process skills
2. Another objective of the process is to provide an intellectual focus to the subject content of the instructional sequence

that will follow. Although the purpose of the activity is not to teach content (that follows later), it does provide an opportunity for all students, regardless of their ability, to become actively involved in discussing the area which is to be studied.

3. A third objective is to confront students with an intellectual exercise which is rarely provided in the traditional school curriculum. From the first grade through graduate school, students are given a set of categories and asked to scan a body of information and subsume under each category heading items that "fit." However, they are rarely confronted with the task of scanning a body of data, determining those elements which have common properties, organizing them according to a logical, self-determined basis and providing a category heading which indicates the main idea of the items grouped. The latter task calls for a great deal more perceptive and organizational ability. Also, the latter has a great deal more practical application.

Teaching Strategies

There are three basic skills within the cognitive task of concept diagnosis. These are listing, grouping and labeling.

Listing Process

The objective for the listing process is one of diagnosing the students' dimensions of the concept. Assuming that the teacher wishes to determine quite specifically how much the students know, and how much they do not know concerning the area to be studied, the listing process is designed to obtain this information.

Processes In Concept Diagnosis

The initial question, as you see, calls for remembered information concerning the concept or area to be studied.

What could we buy in the supermarket?

What do you know about Argentina?

What comes to mind when you hear the word, communism?

For kindergarten and first grade children, the technique of asking them to draw a picture is quite effective.

Throughout the listing process the purpose is to determine what students know about the concept. Therefore, attention needs to be given to those discussion skills which will result in the clearest possible rendering of this information.

The first discussion skill to be considered is refocusing. Occasionally, the discussion will move off focus. Simply call it back with a direction, "Let's look at our original question." This is nothing new. Students are adept at getting off focus. Teachers practice the refocusing skill many times every day. Writing the question on the board helps. Refocusing can be accomplished by redirecting student attention to the stated questions.

The second discussion skill is clarifying. Students often use terms that are ambiguous. Ask for clarification, "What do you mean by customs?" or "Can you give an example of a particular custom you have in mind?" There are two reasons why we should ask for clarification when a student gives an ambiguous concept. First of all, remember, the purpose is to find out as much as possible about what the student knows. When he uses a concept such as *customs, culture, experiment,* there is no assurance that either he or anyone else in the class really knows what he has in mind. Simply asking him, "What do you mean?" or "Can you give us examples?" gets at the elements which he has stored in this category. Secondly, when one accepts and lists an ambiguous concept, it sometimes becomes a problem to deal with in the grouping process. Don't reject it--but attempt to clarify and list the elements within the concept.

The third discussion skill is summarizing. Quite often a student buries the idea he is expressing in a long discourse. Ask again for the idea. An easy way of doing this is merely to ask, "How could we put that on the board?" Being able to express ideas in a succinct, straightforward manner is a skill with which many people have difficulty. It most certainly is a skill that students need to practice.

The fourth discussion skill is one which has been given the pretentious name of mapping the conceptual field. This simply means getting as much information as possible without putting words into the students' mouths. It's really not cricket to say, "You've listed many things but you haven't mentioned anything about their religious practices." It is permissible when someone mentions religion to ask, "What did you have in mind?" or "Could you give us examples of what sort of religious practices?" Also, as indicated on the "Teaching Strategies" sheet which follows, it is helpful in breaking mind-sets to broaden the conceptual field periodically by asking, "Are there any other areas that we have missed?"

The last, but certainly not the least, discussion skill is acceptance. Accept all responses without judging them as correct or incorrect. Initially, this may be quite difficult. If a student stated that he would expect to see the Eiffel Tower in London, many teachers would feel a powerful compulsion to correct the misconception immediately.

Processes In Concept Diagnosis

However, KEEP YOUR COOL--WRITE IT DOWN. Remember, the purpose here is not to teach content; it is to diagnose their knowledge of content. Finding out that the child thinks the Eiffel Tower is in London is an important diagnostic discovery. The misconception can be corrected later. Correcting it now will only result in closing off opportunities to gain more information. Therefore, don't laugh; don't smile; just write it down in a completely nonjudgmental manner. If others in the class indicate disagreement, just state, "We'll have a chance to check that out later," and go on to the next student who volunteers information.

Continue the process of listing until you feel quite sure you have obtained a fairly clear picture of what the students know, and do not know, about the concept being diagnosed. This may mean, in some cases, a very limited list. At other times it may result in a very lengthy, complicated listing of elements.

Grouping Process

The next teaching strategy is the grouping process. Its objective is to provide students with the experience of "perceiving relationships and organizing data on a logical basis." The initial question in the grouping process is one of interpretation. It asks for an analysis of listed items to perceive and group relationships with an explanation of the basis for the grouping. An example of the question might be, "Are there items on the list that can be grouped together?" You will find that students will immediately begin to put specific items together in groupings.

In conducting this process there are two discussion skills which need to be given attention. The first is requesting a basis for grouping.

Processes In Concept Diagnosis

A very important element of this process is focusing the student's attention on the basis for grouping. When the basis is not given by the student, ask for it. "What is your reason for grouping _____, _____and _____together?" The purpose is to assist that child, as well as the others listening, to perceive and verbalize logical bases for organizing information.

The second discussion skill is solving grouping disagreements. Often, students will disagree with another individual's basis for grouping. Remember, each individual's conceptual organization is unique. It is important for all students to eventually recognize this. Assist the dissenters to see each other's ideas. A pertinent example of this skill occurred in a class of second graders who were grouping the items they would expect to find in a supermarket. One child said that real guns, knives and bullets could be put together because they were sporting goods. Another boy immediately said, "Nope, knives go with potatoes and tomatoes, because you slice potatoes and tomatoes with a knife." As might be imagined, a considerable discussion followed. Who was right? They both were, of course. They both had a logical basis for categorizing knives, and it was placed in both groups. Obviously, never vote to solve disagreements. The basis for grouping is individual, and voting would not have changed either child's mind in relation to where knives should be grouped. An important objective of the process is to help the students realize there are multiple bases for putting items together.

One other factor to remember in the grouping process: if the list is long and complicated, it is not essential to continue grouping until every item is used. Again, the twofold purpose is to provide diagnostic data, for the teacher, and to give students experience in perceiving and verbalizing relationships. Continue the activity until (a) the necessary diagnostic information has been obtained, and (b) the students are beginning to demonstrate that they have had enough for one session.

At this point, a few mechanical problems in the grouping process should be examined.

Grouping Pictures

For the listing process, kindergarten and first grade children (nonreaders) can be asked to draw a picture of the concept being diagnosed.

> Draw pictures of each member of your family. Use one sheet of paper for each person.
>
> Draw pictures of the things you would expect to see at the zoo. Use one sheet of paper for each thing you would expect to see.

The grouping process can be conducted in any manner which will cause children to group the pictures according to a logical basis. One way of doing this is to have the children place their pictures on the chalk tray and tell what they have drawn. Ask the class if any of the pictures can be grouped together. Then, ask students for the basis of their grouping.

Grouping with Symbols

Sometimes primary children can see the interrelationship between items more effectively if symbols are used to designate the relationship. For example, "What could we buy in the supermarket?"

☐1. Corn
☐2. Beans
△3. Hamburger
±○4. Knives

○11. Real Guns
×12. Clocks
☆☐13. Radishes
☆14. Watermelons

× 5. Pots and Pans

□ 6. Carrots

☆□ 7. Lettuce

⊕+ 8. Milk

⊕+ 9. Ice Cream

+ 10. Candy

△ 15. Steak

△ 16. Pork Chops

‡□ 17. Tomatoes

‡□ 18. Potatoes

○ 19. Bullets

20. Toys

From intermediate grades on, the most effective technique for designating groups seems to be the utilization of alphabetical symbols.

Labeling Process

The final process in concept diagnosis is labeling. The objective of this process is to perceive the main idea which constitutes the basis for grouping a list of items and giving a categorical title to this idea. The initial question for the grouping process asks the students to analyze a group of items and to verbalize a title or label which logically names the group. For example, "Let's look at our first group, what title could be given to this list?"

The basic discussion skill called for is solving labeling disagreements. Often two or more labels will be given for the group being discussed. The strategy requires helping the students verify if the listed items have common properties which are correctly named by the title. For example, "Let's check the items in this group and see if that title fits." Although voting again should be avoided, students should eventually develop the discrimination abilities which will result in the selection of the most inclusive title.

Processes In Concept Diagnosis

At this point, students may wish to regroup certain items in order to make a title fit more logically. Fine, that action demonstrates their perceptual and organizational abilities.

Final Caution

One final caution--follow the procedure in sequence. If the teacher lists, then asks for categories, then subsumes elements of the list under those categories, he has missed the purpose of the exercise. Stick to the sequence proposed. The students will be intellectually stimulated and you will be too.

The following outline is designed to serve as a guide for planning the process of concept diagnosis.

Teaching Strategies

Listing Process

Objective: To diagnose the students' dimensions of the concept.

Initial Question

Ask an open memory question which calls for remembered information concerning the concept or area to be mapped.

What could we buy in the supermarket?

What do you know about Argentina?

What comes to mind when you hear the word, communism?

Discussion Skills

Refocusing: Occasionally the discussion moves off focus, simply call it back.

Let's look at our original question.

Clarifying: Students often use a term that is ambiguous. Ask for clarification.

What do you mean by customs? (Give an example)

Can you give an illustration of what you mean by religious practices?

Processes In Concept Diagnosis

Summarizing: Quite often a student buries the idea he is expressing in a long discourse. Ask for the idea.

How could we put that on the board?

Mapping Field: Attempt to gain as much information as possible.

Are there any areas that we have missed?

Acceptance: Accept all responses without judging them correct or incorrect.

Grouping Process

Objective: To perceive relationships and to organize data on a logical basis.

Initial Question

The initial interpretative question in the grouping process calls for an analysis of the listed items to perceive relationships and to group them with an explanation of the basis for the grouping.

Are there items on the list that can be grouped together?

Discussion Skills

Requesting Basis for Grouping: A very important element of the grouping process is to focus students' attention on the basis for grouping. When the basis is not given, ask for it.

What is your reason for grouping _____, _____ and _____ together?

Solving Grouping Disagreements: Often students will disagree with another individual's basis for grouping. Remember, each individual's conceptual organization is unique. It is important for all students to recognize this eventually. Assist the dissenters to see each other's ideas.

Labeling Process

Objective: To perceive and give a categorical title to the main idea which constitutes the basis for grouping a list of items.

Initial Question

The initial question for the labeling process asks the students to analyze a group of items, and to verbalize a title or label which logically names the group.

Let's look at our first group. What title could we give to this list?

Discussion Skills

Solving Labeling Disagreements: Often two or more labels will be given for the group being discussed. The strategy requires helping the students verify if the listed items have common properties which are correctly named by the title.

Let's check the items in this group and see if the title fits.

Eventually, discrimination abilities should be developed which will result in student selection of the most inclusive title.

EXERCISES ON CONCEPT DIAGNOSIS

Content:

This series of simulation experiences is designed to develop skills within the process of concept diagnosis.

Exercises include:

- Analysis of Opening Questions
- Discussion Skills for Listing Process
- Discussion Skills for Grouping Process
- Discussion Skills for Labeling Process
- Basis for Grouping

Leadership Materials: Exercises on Concept Diagnosis, Leadership Notes

Participant Materials:

Opening Questions
Discussion Skills For Listing Process
Excerpt from Listing Process, Bolivia
Discussion Skills For Grouping Process
Excerpt from Grouping Process, Bolivia
Discussion Skills For Labeling Process
Excerpt from Labeling Process, Bolivia

Rationale:

To develop understanding of and skill in the component elements which make up the process of concept diagnosis

Objective:

Following involvement in these exercises, each participant will be able to demonstrate his ability to conduct the process of concept diagnosis by the following behavior:

1. Successfully developing an opening question to elicit pupil response which meets criteria established for number of elements (15-30) and number of groups (several)

2. Successfully conducting discussion skills of:

    - Breaking modes
    - Clarifying content
    - Summarizing content
    - Requesting basis for grouping
    - Solving grouping disagreements
    - Solving labeling disagreements
    - Accepting responses in a nonjudgmental manner

Sequence	Time	Group	Activity
A	30	SG	Exercise on Opening Questions

This is an inductive exercise designed to develop understanding of the criteria for selecting the opening question for concept diagnosis.

1. Divide each small group into three subgroups. Organize groups roughly according to grade levels.
2. Refer to the Opening Questions exercise. Assign questions as follows:

   Primary group - Group I
   Intermediate group - Group II
   Secondary group - Group III

3. Ask participants to discuss, and record, what they would expect to obtain in response to each question.
4. After approximately 10 minutes, ask groups to analyze what they have listed to see if they fall logically into any sort of groupings.
5. After approximately 10 more minutes, pull groups together. List and chart on the board the number of elements predicted for each question, and the possible number of groups.

Exercises on Concept Diagnosis

Sequence Time Group Activity

	No. of Elements	No. of Groups
Question 1		
Question 2		
Question 3		
Question 4		
Question 5		
Question 6		

Ask:

1. How do you account for these differences?
2. Which of these opening questions would give the most information about the student's conceptual knowledge?
3. What criteria would you establish for selecting an opening question?

   Open enough to allow all students to respond at their own level.

   Open enough to insure a diversity of items (15-30 elements, several groups)

   Open enough to insure mapping of the student's conceptual field.

6. Ask participants to develop an opening question and check it against the criteria.

B 30 SG Exercise on Listing Process

1. Refer to the exercise Discussion Skills for Listing Process.

Exercises on Concept Diagnosis

Sequence	Time	Group	Activity

2. Divide into subgroups of four to five members. Ask that they respond to the directions as indicated. (See sample responses to this exercise on the next page.)
3. After approximately 10 minutes, reconvene small group and ask participants to indicate how and why they responded as they did.
4. Refer to Excerpt from Listing Process, Bolivia.

   Indicate that this is an excerpt from a 20-minute sequence of the listing process in concept diagnosis. The class was a group of 25 heterogeneously grouped sixth graders. Indicate also that this is the way one teacher conducted the listing process.
5. Read through the typescript and compare it with responses made by participants.
6. Ask, "What do you know about these students and their concept of Bolivia?"

   Familiarity with terminology

   Knowledge gaps in relation to government, religion, culture, history

   About 60 percent pupil participation

Exercises on Concept Diagnosis

SAMPLE RESPONSES,
DISCUSSION SKILLS FOR LISTING PROCESS

The following items were given by sixth-grade children in response to the question: "What would you expect to find if you could visit Bolivia?" Indicate how you would respond to each of the items given. Be specific in relation to where you would ask for clarification of meaning, and where you would ask for a more succinct statement.

> Well, we might find things like in Argentina, like their homes and like building with modern design, and some of them in brick, and things like that. (*Summarizing:* "How could we write that?")
>
> Modern cities, and maybe some sidewalk cafes, and modern clothing that they sell there. (*Clarifying:* "Do you want those listed separately?")
>
> They might ride camels. (*Mapping Field:* "Why do you think they might ride camels?")
>
> They might have Gauchos. (*Clarifying:* "What do you mean by Gauchos?")
>
> They might have some underdeveloped places. (*Clarifying:* "What would you include in underdeveloped places?")
>
> They speak a different language and they have darker skin. (*Acceptance:* "Do you want that listed as one or two items?") (*Mapping Field:* "Do you have an idea of what the language would be?")
>
> Bolladaros. (*Clarifying:* "What do you mean by bolladaros?")
>
> They might have a lot of different customs. (*Clarifying:* "Can you give us some examples of what you mean by customs?")
>
> Well, they might not all have modern clothes; they might have other kinds of clothes, like baggy pants. (*Summarizing:* "How would you like me to write that?")
>
> They might have different kinds of schools; they might be taught different things than we are. (*Clarifying:* "What do you mean by different kinds? How would they be different?") (*Mapping Field:* "What different things would be taught?")
>
> They may have a bay for ships to come in for imports and exports. (*Clarifying and Mapping Field:* "Could you give examples of imports and exports?")

Exercises on Concept Diagnosis

Sample Responses, Discussion Skills for Listing Process

They might have railroads going to the mines. (*Mapping Field:* "What kind of mines?")

They probably live off the land mostly, and they probably have, most the people...most the people, probably live on ranches and have big ranches and cattle and stuff. (*Summarizing:* "Could you state that in a sentence that we could put on the board?")

Different natural resources. (*Clarifying:* "What do you mean by natural resources?") (*Mapping Field:* "What natural resources?")

Sequence	Time	Group	Activity
C	30	SG	Exercise on Grouping Processes

This activity is designed to develop an understanding of two aspects of the grouping process:

a. The basis for grouping:

    Descriptional
    Abstract

b. Discussion skills involved in grouping:

    Requesting basis for grouping
    Solving disagreements
    Nonjudgmental acceptance of responses

1. Refer to the exercise on Discussion Skills for Grouping Process.
2. Divide participants into small groups of three to six members.
3. Ask that they follow the directions as indicated.

Exercises on Concept Diagnosis

Sequence	Time	Group	Activity
			4. After approximately 15 minutes, reconvene the total group to share the exercise results and discuss the basis for their grouping. 5. Refer to the Excerpt from Grouping Process, Bolivia. Indicate this is an excerpt from a 15-minute sequence of the grouping process in concept diagnosis involving 25 sixth-grade, heterogeneously grouped students. 6. Read through the typescript; highlight the process of asking, "Why?" 7. Ask, "What do we know about these students as a result of this process?" *Somewhat limited ability to perceive and verbalize relationships*
D	20	SG	Exercise in Labeling Process This exercise is designed to develop skill in the labeling process of concept diagnosis. Pupils, almost inevitably, offer two or more alternatives as labels for a particular group. There is a tendency to "vote" as a means of deciding on a specific label. It should be recognized that certain labels can, and probably should, be eliminated through a refining process because they are not

appropriate. However, if the label fits, it should be retained, regardless of how many labels are given. The important factor is for pupils to be given the opportunity to engage in the intellectual activity of developing and refining their own criteria of acceptance.

1. Refer to the sheet, Discussion Skills for Labeling Process. Ask participants to respond to the directions as indicated on the sheet.
2. Ask participants to explain why they feel as they do in relation to their response to the question.
3. If some participants have suggested voting to resolve disagreements, ask, "What intellectual process is called for in the labeling process?"

   Examination of grouped items and verbalization of the main idea which constitutes the basis for their relationships.

   "What intellectual process is called for in voting?"

   Decision of what you believe in and indication of it.
4. Refer to the typescript, Excerpt from Labeling Process, Bolivia. Indicate

that this is an excerpt from a 15-minute sequence of the labeling process in concept diagnosis. Ask participants to read it and determine if they still feel the same about their decision for procedure.

5. If some participants are still doubtful about allowing pupils to agree on labels which the teacher feels are less than satisfactory, don't push it at this point. Suggest that they be observant of the procedure followed in the coming demonstration, and attempt to determine what might be an alternative procedure.
6. Ask, "What do we know about these students' ability to examine grouped items and verbalize the main idea which constitutes the basis for their relationship?"

   They operated on an emotional level rather than on an intellectual level. Each held to his own idea.

E 30 SG

Application of Concept Diagnosis to Development of Instructional Unit

1. Now that participants have had a number of experiences with the elements of concept diagnosis, ask them to make an application of this knowledge by

Exercises on Concept Diagnosis

Sequence	Time	Group	Activity
			developing a concept diagnosis question with which to open their instructional unit. 2. Indicate that they are to write the opening question and list the responses that they think it will elicit. Also, if time permits, they should develop possible groupings and labels. 3. Reconvene at the end of approximately 30 minutes.
F	30	SG	**Evaluating Concept Diagnosis Opening Questions** 1. Select two volunteers from different grade levels and ask that they put the following on the board: a. The generalization and illustrative model for their unit b. The opening question for concept diagnosis c. Six to ten examples of possible responses 2. Discuss in relation to the following questions: a. Would the question serve to diagnose students' knowledge and attitudes regarding the concepts in the generalization? b. Is it easily understood? c. Is it likely to elicit a number of responses of specific factual data?

Sequence	Time	Group	Activity
			3. At this point, advise participants to begin listing learning experiences to be used in their instructional units. (Refer participants to A Rationale for Curriculum Development, pages 142-153.)

OPENING QUESTIONS

Group I:

What do you need in order to build a house?

How do you build a house?

Group II:

What do you know about words?

How did our language develop?

Group III:

What comes to mind when you hear the word, communism?

What are the political principles which underlie communism?

DISCUSSION SKILLS FOR LISTING PROCESS

The following items were given by sixth-grade children in response to the question: "What would you expect to find if you could visit Bolivia?" Indicate how you would respond to each of the items given. Be specific in relation to where you would ask for clarification of meaning, and where you would ask for a more succinct statement.

> Well, we might find things like in Argentina, like their homes and like buildings with modern design, and some of them in brick, and things like that.
>
> Modern cities, and maybe some sidewalk cafes, and modern clothing that they sell there.
>
> They might ride camels.
>
> They might have Gauchos.
>
> They might have some underdeveloped places.
>
> They speak a different language and they have darker skin.
>
> Bolladaros.
>
> They might have a lot of different customs.
>
> Well, they might not all have modern clothes; they might have other kinds of clothes like baggy pants.
>
> They might have different kinds of schools; they might be taught different things than we are.
>
> They may have a bay for ships to come in for imports and exports.
>
> They might have railroads going to the mines.
>
> They probably live off the land mostly, and they probably have, most the people...most the people, probably live on ranches and have big ranches and cattle and stuff.
>
> Different natural resources.

EXCERPT FROM LISTING PROCESS, BOLIVIA

T: "I would like to ask you a question, to see what you think about this. You have been studying South America, of course. You have studied Argentina and other countries of South America. I don't think that you have had a real study yet of Bolivia. So just thinking for a minute about the opportunity that you might have some day to go to Bolivia, hopefully all of us some day will have that opportunity, let's think now and list on the board the things that we think we might find in going to Bolivia.

1: Well, we might find things like in Argentina, like their homes and like buildings with modern design, and some of them in brick, and things like that.

T: All right. How could I write that down?

1: Well, their homes are in modern design.

2: Modern cities, and maybe some sidewalk cafes, and modern clothing that they sell there.

T: All right, now you've put several things there. Do you want me to list those separately?

2: Doesn't matter to me.

T: All right, we'll say modern cities.

T: What else did you say?

2: Sidewalk cafes and modern clothing that they might sell.

T: You'll have to pardon my writing here. I guess you can all read it, can't you?

3: They might ride camels.

T: Camels?

3: Yes.

4: They might have Gauchos.

T: Gauchos, what do you mean by Gauchos?

4: That's their cowboys.

T: Is that how you spell that?

Class: Yeah....

5: They might have some underdeveloped places.

Excerpt From Listing Process, Bolivia

T: What do you mean?

5: Well, places where the people live in, outhouses; where they don't get the proper food. Slums, I guess you'd call it.

T: O.K., now what would you like me to write down? How can I put that down? Several things have been mentioned here.

5: Underdeveloped places.

6: They speak a different language and they have darker skin.

T: All right. There are two things there. You want me to list both of them?

6: Um-hum.

T: And what was the other thing about, ah....

6: Well, they might have darker skin.

T: Darker skin?

6: Yes, sir.

7: Bolladaros.

T: Gee, you've lost me; what are those?

7: They're, ah, ah, rope or string with balls or rocks tied around the ends.

T: How do you spell that? Do you know? Can someone help us?

8: B-o-l-l-a-d-a-r-o-s.

T: What did you say those were?

7: Bolladaros.

T: And what are they? Tell me again.

9: They're a kind of string that's pretty strong and with balls or rocks tied on the ends.

T: I see, O.K.

10: It has three balls; they use it like a loop.

9: It has three balls and they use it like a loop, a lasso thing.

11: They might have a lot of different customs.

Excerpt From Listing Process, Bolivia

T: What do you mean by customs?

11: Well, like, like, like, somewhere in Argentina, the way they eat; the way they hold their silverware is in a different way than we do; they might have a different way to....

T: Different way to eat?

11: ...different way of doing things.

T: Any others differ? Any other things you would like to add to that?

12: Well, they might not all have modern clothes; they might have other kinds of clothes like baggy pants.

13: Different kinds of clothes.

14: They might have different kinds of schools; they might be taught different things than we are.

1: They may have a bay for ships to come in for imports and exports.

T: Is that how you said it? O.K. Who hasn't had a chance yet? How about you?

15: They might have railroads going to the mines.

T: O.K.

5: They probably live off the land mostly, and they probably have, most the people...most the people, probably live on ranches and have big ranches and cattle and stuff.

T: All right. How could I put that down?

5: They have big ranches and mostly live off the land.

T: And mostly live off the land, is that what you said?

5: Uh-huh.

T: O.K.

16: Different natural resources.

T: Do you have any in mind?

16: No.

DISCUSSION SKILLS FOR GROUPING PROCESS

The following represent items given by sixth-grade students in response to the directions: "Let's list on the board the things we might find in going to Bolivia." Using alphabetical symbols, identify those items that can be logically grouped together.

1. Underdeveloped places
2. Modern cities
3. Modern clothing
4. Modern homes
5. Sidewalk cafes
6. They might ride camels
7. Gauchos
8. People live in shacks and get food from the water
9. Different language
10. Land of Big Feet (section of Argentina)
11. Different pigment of the skin
12. Bolladaros (a weapon)
13. Different ways to eat
14. Different kinds of clothes
15. Modern schools
16. A bay for ships for imports and exports
17. Railroads going to the mines
18. Different industries
19. Estancia (Argentine ranch)
20. Natural resources
21. Pampas
22. Flax

Discussion Skills for Grouping Process

23. Horses

24. Rye

25. Corn

26. Wheat

EXCERPT FROM GROUPING PROCESS, BOLIVIA

T: O.K., I'm sure that we could go on and list quite a number of other things that we would expect to see there. We could probably spend the whole hour doing this, but let's do something a little different now. Ah, while I go through the list and number them, would you read the list over, the things that we have up here, and analyze the list. Look at the list and see if you can see things that seem to go together, that we could group together into a common group--things up here that seem to fit together in a group.

20: Well, you could put number 2, 3, 4 and 5 together all in one group.

T: Why?

20: Well, because the modern cities, and the modern clothing, and the modern homes, and the sidewalk cafes all go together in, like, a group more or less.

T: O.K. Any other thoughts?

21: And then you could put, people live in shacks and get food from water, and underdeveloped places, together too.

T: Now would this be in the A group?

21: No, that would be under B.

T: This would be a different group. Why would these go together?

21: Well, because of underdeveloped places, and the poor people living in shabby homes.

T: O.K.

12: Ah, number 6, they might ride camels; number 7, Gauchos; number 10, land of big feet; and number 21, pampas.

T: Pampas? Why would you put...?

12: Pampas mostly live off the land.

16: Well, pampas and the land of the big feet is ah, all land, land like the pampas lowlands and everything, and the camels and the Gauchos live on the land, and they might ride the camels and then the Gauchos live on the ranches.

T: This will be a new group?

16: Yes.

22: And Estancia too.

T: And where are we now?

Excerpt from Grouping Process, Bolivia

22: ...21, pampas.

T: Oh, 21, excuse me. All right. Any different thoughts on this?

23: Well, you could put 14, different kinds of clothes, with A.

T: 14, you say, will go with A. Why?

23: Because it shows different kinds of clothes, and you could put flax, wheat, rye and corn in a group.

T: Would this be a new group, or a group that we already have?

23: New group.

T: Which would this be? D?

T: Why would you put these together?

23: It shows different kinds of grain, and then you could put number 9, different language, and, and... (silence) ...

T: You think, while I call on someone else.

24: Modern schools should go with A.

T: Why would modern schools go with A?

24: Well, because it's modern.

T: O.K.

25: Different ways to eat could go with A.

T: Why?

25: Cuz the sidewalk cafe that they eat at.

T: Ah, 26?

26: You could put down different industries, number 18 and number 20, natural resources, together. And 16, a bay for ships for imports and exports.

T: 16 and 18, different industries, and 20, natural resources. Why would you put those together?

26: Well, they're all, um, mostly industry, cuz they export many different industries and natural resources.

T: All right. This would be E.

T: All right. Any different thoughts?

Excerpt from Grouping Process, Bolivia

9: Number 17, railroads going to the mines, could go with it too.

T: With E?

9: Uh-huh.

3: I think maybe that these E's could go with D.

13: They could go with A's too.

15: They could go with D because they could be export, maybe not the mines, but they could be partly industry.

T: Would you like me to put it also with D?

15: Well, I think it should be; I don't know what everybody else thinks.

T: O.K.

11: Well, different langauge and different pigment of the skin could go together.

T: Why?

11: Because a different language and pigment of the skin.

T: All right. Would this fit into any group that we have, or would this be a new group?

11: It can go with B. I think, because it has land of the big feet and it has, I don't know.

T: It's up to you.

11: I'd put it in a new group.

DISCUSSION SKILLS FOR LABELING PROCESS

In the activity, concept diagnosis, a sixth-grade class developed several groups. One group consisted of the items:

People live in shacks and get food from water
Underdeveloped places

When asked for a label for this group, the students provided four labels as follows:

Slums
Slums (and underdeveloped places)
The way poor people live
The way people live

If you were the teacher, what procedure would you follow at this point?

EXCERPT FROM LABELING PROCESS, BOLIVIA

T: Let's look over the groups, and see if we can find a title or a name to give to each one of these groups. Let's start with A. In A we have homes with modern design, modern cities, sidewalk cafes, modern clothing, different kinds of clothes, different kinds of schools, and I guess that's it. What sort of a title could we give to that group?

17: Modern day living?

T: Let's try that. Modern...day...living. Any others?

T: Let's check this one out and see if you think it fits. Modern day living, homes with modern design, modern cities, sidewalk cafes, modern clothing, different ways to eat, different kinds of clothes, does this title fit?

Class: Yes.

T: You accept that? All right. Let's try B. In B we have poor people, live in shacks and get food from water, underdeveloped places. I guess that's it.

6: Slums?

T: Slums. Uh-huh.

10: The way people live?

11: The way poor people live?

14: I think that maybe after slums, add underdeveloped places.

T: All right. Let's check these out and see what you think. We have just the two items, poor people live in shacks and get food from water, and underdeveloped places, and we have four possible titles. Slums, slums and underdeveloped places, the way people live, the way the poor people live. How do you feel about this?

5: I think slums.

T: Why?

5: Well, because it's thinking about poor people and underdeveloped places.

T: So you're saying this whole thing?

5: Yes.

T: Any other thoughts on this?

2: Well, I think just slums.

Excerpt from Labeling Process, Bolivia

T: Why?

2: Well, because it's already underdeveloped places, and when you say underdeveloped places, it's just like repeating slums.

4: Slums are only ratty buildings.

T: Slums are only ratty buildings?

4: Uh-huh.

T: Any other thoughts on this?

17: Well, um, I don't like the one on the way people live, because that's not descriptive; it doesn't say poor people or rich people. That's saying the way rich people live too.

T: Can you modify this in any way? Can you be more descriptive?

17: Well, the way the poor people live.

T: The way poor people live.

17: The way some people live, instead of poor.

T: How do the rest of you feel about that?

24: I'm for just slums too, cuz we're talking about the people that aren't rich enough, don't have enough money to afford a large house or anything. Most of the people just live in old shacks, and I think that it should be slums.

T: Did you have your hand up? Oh, I see.

T: Well, what I hear are arguments really for all three of these, or all four of them. We seem to have quite a number of you that seem to think that slums or slums and something added to it is best. At least one of you feels that slums is not adequate. I think most of you are saying something that deals with slums. All right, but I think that we're also having arguments for the fact that any one of these could fit. All right, let's leave that as it is right there. Now let's go to C. In C we have camels, Gauchos, land of the big feet.

DEMONSTRATION OF CONCEPT DIAGNOSIS

Content:	This activity combines a knowledge base with a sensitivity experience by utilizing a typescript, a live or a videotaped demonstration of the processes of concept diagnosis.
Leadership Materials:	Demonstration of Concept Diagnosis, Leadership Notes
Participant Materials:	Concept Diagnosis Typescript Concept Diagnosis Observation Guide
Rationale:	To refine understanding of and skill in the processes of concept diagnosis Also, when conducting the activity with a live demonstration, to provide the opportunity for participants to identify personally with the teaching role
Objective:	Following a guided observation of a demonstration of concept diagnosis, participants will demonstrate additional understanding of the processes by collecting objective data during the demonstration, and subsequently in a reaction discussion, by applying the data to their own personal teaching style and situation.

DEMONSTRATION OF CONCEPT DIAGNOSIS

The purpose of the demonstration is to illustrate, in a classroom setting, the specific processes involved. The demonstration should be conducted by an individual highly skilled in the processes. However, this unit may be conducted using one of three alternative techniques.

I. Analysis of a Typescript
II. Live Demonstration
III. Videotaped Demonstration

I. The typescript can be reviewed in advance and allows questions to be predesigned to focus attention on specific elements of the process. On the other hand, typescripts are usually less interesting for the participants than an actual demonstration.

II. A live demonstration conducted by a skilled leader (though its results may not be as predictable) elicits more personal involvement of participants in the analysis of the process.

III. A local videotaped demonstration conducted by a skilled leader, while not eliciting the degree of personal involvement of the participants as a live demonstration, has the advantage of showing the teacher and students in action. At the same time, it permits a review of selected parts of the demonstration. The leader can preview the tape and design questions to emphasize key points of the process.

Sequence	Time	Group	Activity
A	20	LG	Planning of Demonstration I. Concept Diagnosis Typescript 1. Read the typescript in advance. Determine the specific points

to which you wish to call attention in the reaction discussion.

II. Live Demonstration

1. Arrange for the use of classroom(s) of students for demonstration(s). If participants represent several grade levels and/or subject matter areas, and if time and personnel permit, it is suggested that several simultaneous demonstrations be given.
2. It may be advisable to visit or write the teacher of each demonstration class in advance to insure a normal classroom situation. (See the sample letter in Preinstructional Arrangements, page 36.)
3. Arrange for appropriate seating for observers.

III. Videotaped Demonstration

1. View tape in advance. Determine strategies to be emphasized. Be sure tape has audible sound and a clear picture to allow participants to follow the concept diagnosis process.

Demonstration of Concept Diagnosis

Sequence	Time	Group	Activity
B	20	SG	Predemonstration Instructions 1. Refer to the Concept Diagnosis Observation Guide. 2. Go over the guide carefully with the participants to be certain they understand what they are looking for. The data collected will be utilized in the reaction discussion. Indicate specifically the importance of concentrating on process and not management of students. 3. Give clear directions as to time and place if live demonstrations are being conducted. Ask participants to be a few minutes early to avoid stragglers. It is best perhaps to have seating arranged in the back of the room.
C	40	SG	Demonstrations I. Typescript 1. Refer to the Concept Diagnosis Typescript and the Concept Diagnosis Observation Guide. Ask participants to read the typescript using the guide to collect data.

Demonstration of Concept Diagnosis

Sequence	Time	Group	Activity
			Demonstrations II. Live Demonstration 1. Use any concept diagnosis opening question that is comfortable for you. The following have been used with success: "What do you need in order to build a house?" "How does your family spend money?" III. Videotaped Demonstration 1. Assign participants to view tape and take data utilizing the Concept Diagnosis Observation Guide.
D	30	SG	**Reaction to Demonstration** There are three purposes for providing participants this opportunity to react to the demonstration: 1. To discuss what was observed and to relate it to their own teaching style and situation 2. To gain insight into systematic and objective analysis of instruction 3. To identify professionally and personally with others at their same grade level or subject area

Demonstration of Concept Diagnosis

Sequence	Time	Group	Activity

Procedures

1. Discuss each of the points on the observation guide. Try for accurate and objective data. When value judgments are offered, ask for supporting evidence. Stick to process. If possible, avoid discussion of management.

2. Ask for expression of problems or concerns relative to making an application of this process to one's own teaching situation. Allow the other participants to react to the concerns. Direction from the group is likely to be more persuasive than from the leader at this point. For example, a participant may state the following:

> "It really bothers me not to correct misconceptions when the students state them. Aren't you allowing them to proceed with the wrong information?"

Group discussion of the concern is very likely to result in the obvious answer that the teacher should note the misconceptions at the time they occur but correct them in the developmental portion of the unit.

CONCEPT DIAGNOSIS TYPESCRIPT

Teacher: Now, today I'd like for you to think about a question and then we'll do some talking on this question. What do we know about Japan and India?

(pause)

Teacher: Barbara?

Barbara: India has a large population.

(pause)

Teacher: Someone else?

Lange: Most of the time, even today, India has been under British rule and only recently become an independent....

Teacher: Now, let's see if we can get all that down. Most of the time....

(pause)

Lange: India has been under British rule....

(long pause)

Teacher: Is that it?

Lange: Yeah.

Teacher: Mark?

Mark: India is bordered by the Himalayas on the North....

(pause)

Teacher: Someone else?

Carl: It has a food problem....

Teacher: Who's, it?

Carl: India, India has a food problem....

(pause)

Teacher: Another one? Christy?

Christy: Japan is almost an island.

Teacher: Now, what do you mean by Japan is almost an island, Christy?

Concept Diagnosis Typescript

Christy: Well, there's a small string of islands that go out to the ...connect with the....

Lange: Well, that makes it an island because it isn't connected with the land...with the mainland...with Asia.

Teacher: How 'bout it, Christy?

Christy: Yeah.

Teacher: Is it surrounded by water? Is that what you meant? Then, we want to eliminate this "almost."

Christy: Yeah.

Teacher: ...is an island. Is that right?

Christy: Yeah.

(pause)

Teacher: Anything else you know about Japan and/or India, Carl?

Carl: Yeah, Japan is...the people in Japan eat fish raw.

(pause)

Teacher: Is this common among the Japanese?

Carl: Yes.

Teacher: Another one? Matthew?

Matthew: The staple food in both Japan and India is mainly rice.

(pause)

Teacher: Another one? You had your hand up...Christy?

Christy: The cherry blossoms bloom all through Japan.

Teacher: Now, do you mean all the year or what do you have in mind?

Christy: During the spring.

(pause)

Teacher: The cherry blossoms....

Christy: ...bloom through Japan in the spring.

(pause)

Concept Diagnosis Typescript

Teacher: Mark, did you have your hand up?

Mark: Yes, Mount Fujiama is sacred to them.

Teacher: And are you going to spell Fujiama for me?

Mark: No...(giggles)

Teacher: Let's just give that a shortened name, don't they oftentimes do that? F-u-j-i, is that it?

Mark: Yes.

Teacher: ...is sacred, is that it, Mark?

Mark: Yes.

Teacher: Did you have something, Barbara?

Barbara: The main industry of Japan is fishing.

(pause)

Teacher: Anything else you know about Japan or India? Jim?

Jim: The capital is Tokyo.

Teacher: Of what?

Jim: Japan.

(pause)

Teacher: Kathy?

Kathy: Ah...Japan has many different customs that they use.

Teacher: Would you like to be a little more explicit?

Kathy: Well, they worship all different kinds of, um, idols...and things.

Teacher: Now, shall we list them underneath? Japan has many different kinds of customs you said, and enumerate some of those customs.

Kathy: OK.

(pause)

Teacher: ...and one was the worship of idols. Did you have any others in mind, Kathy?

Kathy: No.

Teacher: Does someone else have some in mind?

Betsy: Um, they take off their shoes before they come in the house and they sit on the floor when they eat.

Teacher: You want to put those two things in? ...take off their shoes before coming in the house...and the other one was?

Betsy: They sit down on the floor when they eat.

Teacher: Someone else have a custom? Shannon.

Shannon: The main religion is Buddhism.

Teacher: Would that come under custom or would that be another idea?

Shannon: That would be another one....

Teacher: Pardon...?

Shannon: That would be another one.

Teacher: I'll put...then.

Shannon: Yes, yes.

Teacher: OK, does anyone have any more customs before we put Shannon's down. OK, Shannon.... And when you were talking about their main religion you were talking about the Japanese?

Shannon: Yes, Japanese.

(pause)

Teacher: I'll put a "J" after that to show it was Japan.

Teacher: Christy?

Christy: Well, their houses are mainly made of, ah, sort of a straw material.

(students call out "rice paper")

Teacher: Rice paper...and again this is Japan.

Christy: Yes.

Teacher: Would it be better to put Japan has and then when we come back to these again, we'll know which one is which? Now, let me check that...did you say that they were all made of rice paper or mainly made of rice paper?

Concept Diagnosis Typescript

Christy: ...mainly made of rice paper.

(pause)

Teacher: Another one? Carl?

Carl: Their writing is mainly made of symbols.

Teacher: And this is for...which one?

Carl: Japan.

Teacher: Is this true for India too? Do you know?

Carl: Um. Not that I know of.

Teacher: Someone else? Betsy? Barbara?

Barbara: Japanese has the most....

Teacher: Could you put that in a little shorter form? Could you think about it for a minute and then we will come back to you. Betsy, did you have something?

Betsy: Yeessss..., they consider cows as sacred.

(pause)

Teacher: They think cows are sacred. Is that better? Mark?

Mark: Well, in India the children don't get to pick their own wives or husbands, their father does it for them when they're born.

Teacher: Could you put that in a shorter form and we'll come back to Barbara. Did you think of yours now, Barbara?

Barbara: Um. They use symbols when counting.

(pause)

Teacher: Mark?

Mark: In India, the parents pick the wives and husbands.

(pause)

Teacher: Someone else? Christy?

Christy: In Japan, they pick the wives and husbands, too, the father does.

(pause)

Concept Diagnosis Typescript

Teacher: Tricia, you had something.

Tricia: In India, they're very sacred and they, in holy times, believe that they will come back as a cow or an animal.

Teacher: Can we shorten that? Make a, a briefer statement so we can write it easily?

Tricia: Um. In India, when they come back, they believe they'll come back as an animal.

(pause)

Teacher: Now, let's just have one or two more, Lange?

Lange: In World War I, India had British military bases and naval bases.

Teacher: That was World War I?

Lange: Yes.

Teacher: Military and naval bases?

Lange: No, just naval.

Teacher: Just naval?

Lange: Yes...well, they might have had military but I don't know, military, I don't know.

Teacher: Betsy?

Betsy: In Japan, baby girls...they wrap their feet up and, um, they learn to walk with their feet tied up together and that's why they take such small steps.

Teacher: That's a long, long statement, isn't it? Can you make it anymore concise?

Betsy: Um. Baby girls, um, wrap their feet up.

Teacher: Did you want to specify girls?

Betsy: Yeah.

Teacher: You really made it concise, didn't you? And didn't you say something about, this leads to short steps?

Betsy: Yes.

Concept Diagnosis Typescript

Teacher: Let's see, we had a couple of hands back here, then let's finish up. Christy?

Christy: The costumes in Japan are kimonos or long brocade gowns.

Teacher: What do you mean by brocade?

Christy: Well, silk, sort of silk material.

Teacher: Jim, you had one.

Jim: India's captured pieces of Pakistan.

Teacher: And what's Pakistan, Jim?

Jim: It's a country in the, well, it is split, there's one on the east and another one on the west.

Teacher: That's where they've been fighting, is that what you're telling me? Ah, there's hands that keep raising and raising and so we'll take one more. Shannon?

Shannon: In World War II, Hiroshima was bombed...by the U.S.

Teacher: OK.

Student: ...atom bomb...

Teacher: Do you want atom bomb in there, Shannon?

Shannon: Yes, OK.

Student: A lot of Japanese cities were bombed, but.... Hiroshima was the worst.

(pause)

Teacher: Now, as you look over the 25 items we have listed, do you see any that are closely enough related so that we might group them? As one group, Matthew? ...already!

Matthew: Well, the ones with religion in them, like No. 13 and No. 17, No. ah...all the ones with religion in them should be grouped together under one thing.

Teacher: Thirteen and seventeen, were there any others?

Matthew: Well, Item 5, worship of idols....

Teacher: That could go in there too. All right, that would be a group. Anyone disagree with Matthew?

Concept Diagnosis Typescript

Lange: No. 9 could be counted too.

Teacher: OK, Matthew? All right, let's make that Group A...9, 12.

Lange: Well, 12 isn't, um, A, because, um, taking off shoes before coming into the house and sitting on the floor to eat aren't in worship of....

Teacher: I guess that doesn't have to do with worship, No. 17....

Teacher: Any others? Ron?

Ron: No. 20.

Teacher: That goes in with religion.

Ron: Yes.

Mark: I don't think No. 20 should go in with religion because it's a custom, kind of.

Teacher: Someone dies, he will come back as an animal, you would put that in another group then, other than A. What would you put with 20, Tricia?

Tricia: No. 12, takes off their shoes before coming in the house and sits on the floor to eat.

Teacher: Would this be a Group B?

(pause)

Teacher: ...and then this could go with Group B. Does that satisfy you?

Tricia: Yes.

Teacher: Shannon, you had your hand up.

Shannon: Well, um, No. 22 should go with customs.

Teacher: In with Group B then?

Shannon: Yes.

Teacher: OK.

Teacher: Mark?

Mark: Well there's a three and five that belongs with physical geography.

Teacher: And so you would put those in a group. Would either Group A or B....

Concept Diagnosis Typescript

Mark: No, neither group.

Teacher: Neither group. Three and five...Tricia?

Tricia: Um, 23 could go with B.

Teacher: Why?

Tricia: Um, well, because that's their costume just like we have our styles today, kind of a custom.

Teacher: That's comparable to wrapping a girl's feet. Kathy?

Kathy: Eighteen and nineteen should be put together.

Teacher: Why?

Kathy: Well, because they're about the same.

Teacher: Why are they about the same? In India the parents pick the wives and husbands and in Japan the father picks the wives and husbands.

Kathy: In Group B, would be traditional....

Teacher: You would put this in Group B...along with taking off their shoes.

Kathy: Having to do with custom....

Teacher: Anyone disagree with that? Mark, did you have something else then?

Mark: Well, No. 2, No. 21, No. 25 are history.

Teacher: Would you read those for us, Mark, please?

Mark: Most of the time India has been under British rule and has only recently become independent...and, 21, is...in war, in World War I India had British naval bases...and in World War II Hiroshima was bombed by an atom bomb.

Teacher: And that would be a new group, Mark? That's Group D.

Mark: Yes.

Teacher: Betsy?

Betsy: I think that 46 and 7 should go together because they are all about school.

Teacher: Would this be a new group?

Concept Diagnosis Typescript

Betsy: Yes.

Teacher: Group E. Anyone disagree? Speak up.... Lange? Did you have something?

Lange: Ah, a different group.

Teacher: A different group...what was your group, Lange?

Lange: Fifteen and sixteen is a new group, um, about the writing.

Teacher: This is F and, Ron, what were you going to say?

Ron: No. 11 should go with Group C....

Teacher: Why is that?

Ron: Well, because it's part of the history.

Teacher: The capital of Japan is Tokyo is part of the history.... You would put that with Group C.

Lange: Um, it isn't the history, it's geography.

Teacher: India is bordered by the Himalayas on the northern border and Japan is an island, is that the group you wanted it in, Ron?

Teacher: Barbara?

Barbara: I think that 11 should go with D because, um, if you tell how Tokyo got to be the capital then it would be history.

Lange: It wouldn't be history...but that's a statement about geography.

Teacher: But, you feel that if you traced it back that you would be getting some history, well, could we put it in both groups?

Barbara: Yes.

Teacher: Could you put it in both groups, Lange?

Lange: Well, the way the statement is, it would be geography. You'll have to rephrase it as it was included in history.

Teacher: And how would you rephrase it, Lange?

Lange: Um, well it would have to be....

Teacher: Have any ideas on that?

Lange: Well, um...like the history of Tokyo and um...it would go under the history of Tokyo.

Concept Diagnosis Typescript

Teacher: Can you see Barbara's reasoning?

Lange: Yes.

Teacher: Then let's put D up there, you can still keep your group, part of the geography, and you could see hers as part of the history. Jim?

Jim: No. 10 should go under E.

Teacher: And what does that include...No. 10 is, the main industry of Japan is fishing and you would put it with what?

Jim: Food.

Teacher: The food, the raw fish and....

Lange: Well, that wouldn't be related...it's about...that's an occupation, but it's related to it.

Barbara: Because of what, um, what it brings in. But it's a different subject.

Betsy: No, it isn't. You could put it in both then.

Teacher: You would put it in E and then also have another group.

Barbara: Yes. Um hm....

Teacher: And what would we call that other group?

Lange: G.

Teacher: G. All right. Christy?

Christy: Ah, 24 would be in D, because India has captured pieces of Pakistan.

Teacher: All right, that's history too. Any disagreement? Lange, you had something?

Lange: Um, 14 should go with B because...well B, because it would be a new group...well, it isn't related to anything else.

Barbara: Do you think it could be customs?

Christy: Can you build houses out of rice paper?

(laughter)

Lange: I wouldn't say it was customs.

Barbara: Maybe it could be industry or architecture....

Concept Diagnosis Typescript

Teacher: Let's put a question mark and we'll think on that. I have a feeling that Lange had an idea and then when he looked at it again it wasn't quite so good as the first time, is that it Lange?

Lange: Yeah, well, I was going to say it was a custom but it isn't, really...it doesn't....

Teacher: Mark?

Mark: I think that we could make a new group, 1 and 14, would call it G and that would be about the people and how they live.

Teacher: The way people live....

Voices: Yeah, right.

Teacher: No. 1, No. 10 and No. 14?

Mark: Yeah.

Teacher: All of that fits...Matthew, um hm.

Matthew: Well, I think No. 24 shouldn't be under history but should be under, um, geography because it's captured....

Lange: It should be under both because it is history but they were captured and it has to do with geography because it enlarged the pieces of Pakistan....

Mark: ...the people of Pakistan....

Teacher: And so that would be...what was the other letter?

Mark: Should be C....

Teacher: And Betsy?

Betsy: No. 8 should just be in a class by itself....

Teacher: The cherry blossoms within the...that's an H then? Now, we have them all grouped, don't we? Now what would you call Group A if you were going to give it a title, and maybe we better have Barbara read those for us in Group A. Can you do that?

Barbara: ...worship of idols...the main religion is Buddhism.... In India, they consider cows as sacred.... Um, in India, when they die, they believe they will come back as an animal.

Teacher: And that's it. Some ideas now...Jim?

Concept Diagnosis Typescript

Jim: Well, you could call it customs and religion.

Teacher: Customs and religion...the whole term...another one?

Christy: Ah, ah, No. 19 is different and it's not....

Teacher: Did you have another title besides customs and religion?

Christy: No.

Teacher: Mark? Do you....

Mark: I think it should just be religion because we have a separate group for customs.

Lange: Yeah, but anyway, um, religion changes...it isn't a custom because a custom is handed down.

Teacher: How about that, Jim?

Jim: So what if it's handed down, it does change.

Teacher: Now, we have customs and religion...then we have religion alone and, Mark, you have another idea.

Mark: I think it should just be religion...customs is how they live, sort of, not what they believe.

Teacher: Any others? Let's put both up here, for right now and we may resolve the problem as we move on...religion and customs is the first...and then just religion. Now, looking at Group B, what would you call that?

Kathy: Um, B would be customs and then you could have A for religion and customs...then you would have to put all of B in A....

Student: Could you do that?

Kathy: ...because the two things are alike.

Teacher: Yes, Betsy, you had some ideas.

Betsy: I was going to say B should be customs and A should be just religion.

Kathy: Right....

Lange: B should be...um....

Jim: B doesn't have anything about religion but it's a custom.

Lange: Yeah, they're customs so you couldn't include customs in A.

Concept Diagnosis Typescript

Teacher: What's your definition of customs, Jim?

Jim: Well, um...how they live and, um, and...how, well, how customs are handed down...you know, things like that.

Teacher: Now, where did you see religion in the A group, Jim, what aspects of religion?

Jim: The worship of idols....

Kathy: Or it could be, um, part of their religion.

Teacher: A custom could be....

Kathy: A custom could be part of their religion.

Teacher: Do we, perhaps, need to do some regrouping of these two? So we put A and B together, would that solve our problem?

Tricia: No.

Teacher: No, Tricia says....

Tricia: I think that religion and customs should be, ah, A and B.

Teacher: Religion for A, B for customs....

Voices: Yeah, um hm.

Teacher: Still have two titles for A then, don't we? C? Matthew?

Matthew: Geography.

Teacher: Another one? Lange?

Lange: I was going to say geography....

Teacher: That's agreeable. D? Kathy?

Kathy: History.

Teacher: Lange, another one?

Lange: History.

Teacher: History, Betsy?

Betsy: C is, um, "the capital of Japan is Tokyo," I don't see how that could go with geography.

Lange: That's political science.

Betsy: I don't think it should be in there.

Concept Diagnosis Typescript

Lange: You could put it in a unit....

Teacher: We have C and D, could you put it in with D as history which Kathy suggests for a title?

Betsy: Yeah.

Teacher: I think we discussed that particular one before.

Lange: Change the way it's formed, I guess...if you say that the capital of Japan is made Tokyo on a certain date then it would be history...right now...saying that the capital of Japan is....

Teacher: Betsy, were you the one who thought it was a part of history? She's, perhaps, seeing it in that light.

Teacher: What about E?

Lange: E is food.

Teacher: Ron, would you go along with that? Food for E? What about you Carl?

Carl: Yes.

Teacher: Did you have something else, Betsy?

Betsy: I was thinking it would fit under industry because the main industry of...is fishing. I would put under industry because they are both in there.

Teacher: That would include more. What do you think about it...is that a better title?

(general agreement)

Teacher: Matthew, did you have something?

Matthew: Industry is outspoken...the other group is...and is a bit more...than the....

Teacher: OK, now what about...with everything left up here...so let's take a look at what's under E.

Teacher: Mark, you can see all those, can't you, would you read them to us, please?

Mark: India has a food problem...the people of India eat fish raw ...the staple food in both Japan and India is rice...um, the main industry of Japan is fishing.

Concept Diagnosis Typescript

Teacher: Now, Betsy says that it not only includes food but it also has industry...what about it, Matthew?

Matthew: It...put G in another group you could have it...the way the people live and then...you would...put G in the other one....

Teacher: And then we could change the title of another group, but you agree that this food and industry covers more than just food....

Teacher: Lange?

Lange: Writing.

Teacher: Writing for F.

Lange: Yeah.

Concept Diagnosis Typescript

Student Responses

What do you know about Japan and India?

G 1. India has a large population.

D 2. Most of the time India has been under British rule and has only recently become independent.

C 3. India is bordered by the Himalayas on the north border.

E 4. India has a food problem.

C 5. Japan is an island.

E 6. The people in Japan eat fish raw.

E 7. The staple food in both Japan and India is mainly rice.

H 8. The cherry blossoms bloom through Japan in spring.

A 9. Mount Fuji is sacred.

E G 10. The main industry of Japan is fishing.

C D 11. The capital of Japan is Tokyo.

12. Japan has many different kinds of customs:

A. Worship of idols
B. Take off their shoes before coming in the house
B. Sit on the floor to eat

A 13. Their main religion is Buddhism. (Japan)

G 14. Japanese houses are mainly made of rice paper.

F 15. Japanese writing is mainly made of symbols.

F 16. All of the Japanese writing symbols have never been counted.

A 17. In India, they consider cows as sacred.

B 18. In India, the parents pick the wives and husbands.

B 19. In Japan, the father picks the wives and husbands.

B A 20. In India, when someone dies, they believe they'll come back as an animal.

Concept Diagnosis Typescript

D 21. In World War I, India had British naval bases.

B 22. Baby girls born, wrapped their feet → short steps.

B 23. The costumes of Japan are kimonos or long brocade gowns.

C D 24. India has captured pieces of Pakistan.

D 25. In World War II, Hiroshima was atom bombed by the United States.

The groupings decided upon by this class follow:

A. Religion and Customs
A. Religion
B. Customs
C. Geography
D. History
E. Food and Industry
F. Writing of Japan
G. Ways of Living
H. Agriculture

CONCEPT DIAGNOSIS
OBSERVATION GUIDE

Teacher ____________________

Observer ____________________

Grade and Subject ____________

I. Listing Question ____

____

Tally the number of times that the following behavior was observed:

Extended period of silence ____________________

Refocusing the discussion ____________________

Encouraging pupil participation ____________________

Pursuing for additional information ____________________

Asking for clarification ____________________

Asking for summarization ____________________

____

None (Pupil Participation) 100 Percent

II. Grouping Question ____

____

Tally the number of times that the following behavior was observed:

Students grouped on descriptional basis ________________

Students grouped on abstract basis ________________

Teacher asked for basis of grouping ________________

Teacher handled disagreements by:

Dropping (Moved away from disagreement without solution) ____________

Tabling (Set disagreement aside for future consideration) ____________

Voting (Called for vote to resolve disagreement) ____________

Concept Diagnosis Observation Guide

Intervening (Teacher imposed solution) ______________

Solving (Led discussion to point where students resolved disagreement with apparent mutual satisfaction) ______________

III. Labeling Question ____

____

Tally the following:

Number of groups with just one label ______________

Number of groups with more than one label ______________

Number of times items were regrouped in order to fit a label ______________

Number of times items were verified as fitting the label(s) ______________

____

None (Pupil Participation) 100 Percent

IV. Following the observation, indicate below what you feel you now know about this group of students.

Content:	This unit combines a knowledge base with a sensitivity experience. Participants analyze a concept diagnosis typescript for: Question patterns Patterns of pupil-teacher behavior Teacher's knowledge of pupils Possible next instructional steps
Leadership Materials:	Typescript Analysis of Concept Diagnosis, Leadership Notes
Participant Materials:	Analysis Exercise, South America
Rationale:	1. To provide a final review of the concept diagnosis processes 2. To identify specific teaching patterns which affect the results of the lesson 3. To identify the value of the concept diagnosis task for both the teacher and the students
Objective:	Following the analysis and discussion of a typescript of a class engaged in the concept diagnosis process, participants will demonstrate a refined awareness and understanding of the process by successfully implementing it in a laboratory experience.

OPTIONAL ACTIVITY

TYPESCRIPT ANALYSIS OF CONCEPT DIAGNOSIS Leadership Notes

This activity is designed to provide a final review of concept diagnosis processes prior to participants preparing for their laboratory teaching experience. However, it should be considered an OPTIONAL lesson which may be utilized with the total group, with a small group or with individuals, depending upon the need. Many participants will be ready at this point to teach. This rather lengthy exercise may be considered obstructing by them. On the other hand, there may be many who need another experience in order to feel secure.

Sequence	Time	Group	Activity
A	45	SG	Typescript Analysis 1. Refer to the typescript, Analysis Exercise, South America. 2. Write the following directions on the board. a. Identify the questions used to start pupils in the processes of listing, grouping and labeling. b. Identify patterns in the lesson and be prepared to support your selection. Explain to participants that patterns are those sequences of behavior (teacher or pupil) which consist of two or more instances of a particular behavior,

Sequence	Time	Group	Activity
			and have an effect upon the results of the lesson. c. Identify what the teacher now knows about this class of pupils as a result of this activity. d. Write down any questions or concerns relative to the concept formation processes. 3. Ask participants to work individually on this exercise for the next half hour. 4. After approximately 30 minutes, ask them to compare results with a neighbor. Adjourn in approximately 15 minutes.
B	30	SG	Discussion of Typescript 1. Conduct the following discussion: a. Identify and discuss the listing, grouping and labeling questions. Ask participants to rephrase questions in a form which will appropriately reflect their own teaching style. b. Ask participants to indicate what patterns they noted in the typescript. Ask for supporting evidence, for example:

Typescript Analysis of Concept Diagnosis

Sequence	Time	Group	Activity
			Participant: The teacher is nonjudgmental in his relationship with students.
			Leader: Where do you see evidence in the typescript of this behavior?
			Participant: Page ____ and page ____.
			Leader: Is there any evidence of the effect of this on the lesson?
			Participant: All pupils seem to be willing to respond; some seem willing to challenge.
			Leader: Where do you find evidence to support that?
			Patterns which can be identified are noted on the leader's typescript with the following key:
			A ACCEPTANCE (Accepts response without judgment)
			C CLARIFICATION (Seeks clarification of words or ideas)
			MCF MAPPING CONCEPTUAL FIELD (Probing for additional information)

Typescript Analysis of Concept Diagnosis

Sequence	Time	Group	Activity
			S SPECIFYING (Asking for specific information)
			MQ MULTIPLE QUESTIONS (Two or more questions asked at the same time)
			Ed EDITORIALIZING (Changing students' ideas and terminology to his own)
			S SUMMARIZING (Calling for the main idea of a statement)
			PC PERCEPTION CHECK (Checking understanding of what the student said)
			AT AUTONOMOUS THINKING (Students express and extend ideas independently of teacher cues)
			SP SEEKS PARTICIPATION (Seeks active discussion, sometimes comes through as refocusing)
			PPP PUPIL-PUPIL PARTICIPATION (Active pupil discussion without intervention from teacher)
			RF REFOCUS (Bringing the discussion back to the topic)

Sequence Time Group Activity

D DIRECTIONS (Giving procedural directions. This is different from patterns of management, which usually deals with materials, and control, which deals with behavior.)

E ETHNOCENTRISM (Looking critically at another culture)

c. Ask participants to indicate what they think the teacher now knows about this class as a result of this activity. Possible responses:

1. *Pupils have an ethnocentric understanding of South America.*

2. *Several children have difficulty expressing their ideas in a succinct, effective manner.*

3. *Some children need to be brought out. They are apparently not willing to risk discussion.*

4. *Many pupils (the class as a whole) need practice in perceiving and organizing relationships.*

5. *Many students show gaps in specific knowledge of South America.*

d. If participants do not indicate the gaps in the pupils' knowledge of South America, ask,

> "What gaps in knowledge are evident in the students' concept of South America?"

Standard of living

Government

History

General culture

Economy

e. Ask, "How might this information be used in planning and teaching an instructional unit?"

NOTE: Many of the participants will not clearly see the implications for bridging from concept diagnosis to the development of the unit. It is important to reemphasize that the diagnostic value of concept diagnosis lies in obtaining information about:

1. Areas needed to be researched by students
2. Areas in which students have some background knowledge
3. Skill areas that need to be developed

Typescript Analysis of Concept Diagnosis

NOTE: In most cases, the grouping labels that children arrive at in concept diagnosis will bear little or no resemblance to the categories of information which the teacher may wish to have them research. The overall value of concept diagnosis lies in three areas:

1. Diagnostic Data for the Teacher

   It results in a great deal of information about the pupils, their understanding of the material to be studied, and their ability to function in a variety of skill areas.

2. Initial Class Involvement

   If used as an opening to the unit, it provides an initial intellectual focus on the material to be studied with most, if not all, students involved in the discussion.

3. Thinking Process Skill

   And most important, it provides experience in the intellectual skill--the process--of perceiving, organizing, summarizing and verbalizing relationships.

ANALYSIS EXERCISE, SOUTH AMERICA

T: Now, this is the question we're working with: "What differences would you expect to find if you went to live in South America?"

62: They probably have huts instead of houses.

A T: All right.

13: In some parts there would be cooler homes.

C T: You mean the insides of the homes would be cooler than ours or....

13: Wouldn't be so hot.

MCF T: Is there another way you could sort of express that...cooler homes?

13: I don't know a much better way to say it.

T: Well, the weather would be much warmer there.

61: They wouldn't have any appliances like we have.

58: Different foods. They have different kinds.

A T: Different kinds of food.

6: Less populated.

57: There would be a difference in the climate.

T: Difference in the climate.

10: The land features would be different.

C T: Different. You mean they would be strange? Or...

10: Well, they have different, more of some things and more of other things than we have here.

S T: All right. Land features different. Can you say it any other way?

10: I don't even know any other way.

A T: O.K. Land features different. All right.

E 5: There would be lots less roads.

14: Some places they would not have water faucets.

53: Well, probably in the cities they'd have, the clothes are the same, but in the mountains they're quite different.

9: Well, there would be different diseases.

2: Well, I think the main problem with me would be that the language would be different.

T: Language different. All right.

60: I would think there would be more farming than here.

8: More animals.

C T: Wild or...?

8: Wild.

7: Different animals.

12: Well, they run their country different.

7: They celebrate holidays different ways. Different ways than we do.

T: Holidays celebrated differently than ours.

13: Different schools.

C T: What do you mean by different schools?

13: They're supposed to be different than ours.

MCF T: You mean run on a different system than ours?

13: Yeah.

15: There would be fewer schools.

E 54: Difficulties with insects.

1: Different flags.

E 9: They are not as rich.

E 53: Well, they progress very little.

12: Their cities are smaller.

E 61: They wouldn't have cars in the little towns and villages.

E 62: Well, the people are farmers and there aren't enough jobs for them. There are more farmers than people who work, work in big business.

MCF T: Umm, haven't we said something here already about, well, there's more farming. All right, more farming than big business. Is that what you want to say?

62: I guess so.

MQ T: Well, who was it that said that? Shall we add hers to this one? Is she going along in the same area you are?

57: In the little villages in the jungle, water would probably be used as main transportation.

6: Customs different.

T: Do we have that at all here?

Several: Yes.

T: Well, we don't have it as such, do we?

E 9: Well, they're educated differently. Probably not too many times, they're probably not educated like arithmetic too much; probably mostly educated how to farm.

5: There are different holidays.

12: Well, I was just reading that farming may be a subject in education. I was just going to say that you could say that their, their education, they don't have as good an education.

12: Poor schools.

ED T: Pardon me? Poorer education? Is that all right?

12: Umm hum.

2: Well, there's a girl in my classroom last year that came from South America and she said that they had, almost all day, they were in school. And that they went home at night and studied at home at night.

S T: Well, how do you want it put down?

2: Well, it's really not that much poorer education.

T: In other words, you disagree with this one?

60: Actually, I think that probably the girl who came in our class was one out of not so many who got to go to school. There's a lot of people who don't get to go to as good a school as she got to go to.

PC T: You think she was kind of an exception?

AT 60: Well, I don't think that all the kids in South America have as long a day and as good schools as she said she did.

10: Kathy, the girl from South America, came from the city, that might be....

Ed T: She might be from a wealthy family?

10: Yeah, she lived in a big city.

Ed T: This could have to do with the quality of education.

62: Well, probably just some people, probably half of the people, have had a good education. But some of them live in the jungle and the tropical places but some people live in the big cities, like the capital of Argentina. That's where Rosie's from, the girl who lived next door to us last year, she came from there and she was, she had skipped about two grades when she came over here.

S T: Well, could we put something down, would that information be background?

10: When they're in the big cities they get better education, but on the farm there's hardly any education but farming.

Ed T: All right. Let's see, city educated better than country.

11: There are not as many stores.

61: Well, lots of the kids would do, well, not really hard work, but they'd be working like...we always have a lot of play time, but compared to them, they're always helping around the house, and going to the store....

S T: How am I to say that?

61: I don't know. They have to work most of the time.

MCF T: Children have to work most of the time?

61: More than we do.

SP T: These people whose hands haven't been coming up, are they blank on the subject or just not used to saying too much in class discussion? This is something I would like to encourage if possible.

3: A lot of progress in cities, big cities, tall buildings.

6: There's more jungle in South America so there's more poorer schools. 'Cause most of it's jungle, not all of it, but most of it is.

T: Let's have one more.

60: Well, it's more drier.

T: Drier, do you disagree?

9: Yeah, I think it would be humid.

C T: Humid, well, when she said dry do you mean in actual air around you or do you mean in rainfall?

AT 60: I don't know what I mean. I just think that it would be more hot. I mean hotter, but it would be more dry because....

MQ T: Well, you could say what you want. Do you want it to be the air drier or moister than it is here, or do you want it to mean rainfall, more rainfall for them to have?

60: Well, I think that, the land should be dry.

MQ T: The land itself, the surface of the land would be drier. Now, I wonder, are there any connecting ideas between these, (pointing to the list) any relation between any of those things at all? Can we bunch these things together, or are they all pretty well single topics that go by themselves?

5: Jungles make running schools difficult and schools run differently.

T: One at a time, which one?

5: Well, schools run differently.

T: Schools run differently.

5: Are we putting them under a heading?

T: We're just sort of bunching them together right at the moment. Let's carry on with this lunch here. Anybody lese want to group anything with this?

6: Poorer schools

PPP 11: Poor education

58: Not so many schools.

Typescript Analysis of Concept Diagnosis

60: Jungles make good schools difficult.

PPP 4: Farming main subject in school.

13: City education probably better than country.

T: Any others?

8: Not as many people.

T: Not as many people. Do you want that one here?

13: You could say less populated instead of that, make it shorter.

6: Are you putting that in school? That's not school.

T: You don't want that with school?

5: It's not about school except there's people in school.

T: Well, we wanted to use what we have there.

6: Less populated schools.

SP T: What do we have...less populated. Is that it? Now, are there any more? Is there anything else we can put together?

11: The weather's warmer.

3: Cooler homes.

PPP 58: Land surface is drier.

60: Climate different.

14: Land features different.

(Refining Relationships)

AT 11: I don't think land features should go there because we were talking about the dryness and the climate.

PC 43: Well, there's land surface drier...the landscape would bring in colder climates than warmer climates, they have other land features.

T: So you think that the dryness of the surface has to do with the features of the land?

43: Yes.

SP T: All right, anyone else want to voice an opinion whether we leave this or take it out?

Typescript Analysis of Concept Diagnosis

(Refining Relationships)

6: Well, I think land features mean more like mountains, so I don't think it belongs in there.

PC T: What 43 is saying is that because of these land features you would have these differences in weather. I think...is that what you're saying, because of these differences in land features you have a difference in weather?

43: Well, like in Greece, in one area they had one kind of tree and in another area they have another kind, or when it's more mountainous, it's colder.

A T: Well, that's acceptable to me.

11: Well, the land surface drier, that has to do with the weather because it makes it that way, but if you put it in land features, then you can put in less roads and stuff like that because it's part of the features of the land.

PC T: Well, we can. In other words, it looks to me as if things are changing a bit here, but at the same time a good part of the class seems to think that this is okay in here.

9: Well, you have heat, that's okay because heat does change land.

SP T: Well, I'll leave it there unless it looks like.... Now, if you want to add anything more to this list, do you have another one?

61: Fewer, less roads.

T: Less roads, this is the one that 11 warned us about.

61: Not in that one.

A T: Oh, you mean you want to try something else? All right.

3: Some places, there aren't water faucets.

53: Water main transportation of the villages.

11: No appliances like we have.

T: No appliances, do you want to put that up?

11: I think it does because that's a convenience, and without water faucets, that's a convenience.

14: Appliances could mean all different kinds of things, like kitchen equipment. It doesn't have to do with weather or....

Typescript Analysis of Concept Diagnosis

RF T: Maybe we're sort of veering off here. Do you want to leave it the way it is? Six, you seem to be outvoted. I'm trying to hold an election. Shall we leave this then for a time or do you want to....

3: Clothes different in the city as compared with the mountains.

61: What does clothes have to do with the climate?

5: Well, you wear cooler clothes, you wear clothes that keep you, like white clothes in jungles and things and then up in the mountains you wear heavy clothes, and a lot of blankets....

SP T: All right. Shall we try another, if there is another bunch, and see if we have something after that?

60: More farming than big business.

T: Anything else? Is that the only one in that bunch?

58: Well, you could put "farming" a subject in education.

T: Okay, is that the entire lot now?

55: The children have to work more than we do. Would that be one?

A T: I don't know. Is that all right? You're the one that put it up there.

55: I think it is, because a lot of times the children that have to work harder, they're usually the ones who live on the farms.

2: Not as many stores.

D T: This is fitting in here? It's not essential to get the same number in each area, necessarily. Whenever you want to call a halt, we can.

10: Different animals.

53: More wild animals.

60: I don't think that if there's going to be wild animals that there would be wild animals in the jungles and not on the farms.

MCF T: What do you think? Is this farming that you're picturing or....

53: Well, where there's farms there are wild animals too. I mean where there's farms there are some wild animals.

T: Well, let's see, what did you want me to put here?

Typescript Analysis of Concept Diagnosis

PPP

60: More wild animals.

9: Difficulty with insects.

61: Huts instead of houses.

8: Poorer education.

A T: Poorer education? Well, it's possible...I mean just because we have it listed already doesn't mean we can't use it again.

55: Building progress in big cities.

58: Cars not found in small towns and villages.

MQ T: (begins to point to the groupings) Do you have something planned for a word...maybe we had better try to top these. Can you do anything with this, got anything you might name it, call it?

10: Well, if you took out that clothing business and that water for transportation, then you could have the CLIMATE.

T: Yeah, remember this doesn't just have to be one word or a pair.

10: You could have CLIMATE AND LAND FEATURES.

C T: Would these things fit in under climate and land features?

Many: Yes, yes.

10: Well, that clothing wouldn't.

T: Five felt that the climate has to do a great deal with the kind of clothes they wear.

10: But you only study about the climate, you don't study about the clothes they wear.

PC T: You mean you haven't had experience doing this in school so far? Is this what you're saying or you really don't think that they would?

10: I really don't think that clothing goes together with climate.

12: Well, if it was snowing you couldn't run around in a bathing suit.

(Refining Labels)

RF T: But we're talking about clothes as affected by the area. Well, too many people seem to think that this has something to do with it.

62: I think that clothes goes with climate because the, well, like 10 said, because you can't, well, if you didn't, you couldn't wear a bathing suit in the winter when it was snowing and you had to wear something real warm.

T: Well, it seems to me we have a general agreement on this. Ten is a little disturbed that mountains and sweat shirts should go together, I guess. What about CLIMATE then?

52: Well, I think climate should be the heading.

PC T: Just plain CLIMATE? Is that right? Do you want to do anything else?

58: You could say WEATHER CLIMATE.

Ed T: Isn't this sort of like saying just plain CLIMATES?

53: NATURAL RESOURCES AND CLIMATE.

AT 57: I don't think the water faucet should be in there.

T: I think that disturbed you the way sweat shirts are disturbing Ten.

57: Well, if you have it under CLIMATE, what does water faucets have to do with climate?

10: When it's real hot and there's no lake for miles around, you aren't going to have water faucets around, but if you've got a real good well down at the end of the road....

57: I still don't think it belongs there.

T: Well, should CLIMATE be it? Anything else other than CLIMATE that would probably be good enough?

60: We could have LAND FEATURES AND CLIMATE.

T: LAND FEATURES AND CLIMATE. Is that all right?

(Points to another group)

12: Education.

10: Well, how does education fit in with poorer schools?

T: You mean because the school isn't there, how can you have any education? EDUCATION, everything under here presumably should have to do with this subject. Doesn't POORER SCOOLS have to do with that?

AT 10: I said it was a poorer school. I didn't say it wasn't a school.

12: I think SCHOOLING is better.

A T: Well, EDUCATION seems to be generally accepted. I suppose that the words say about the same thing. However, if you were doing it, you would be perfectly okay to use it.

This is the big one. What are we going to do with that one? More farming than big business, children have to work harder, what do you want to have for a title there?

2: DIFFERENT KINDS OF LABOR?

T: It sounds like a good title. Is there anything there to fit under that?

2: Well, more farms than big business has to do with labor and farm and management. The subject, EDUCATION, has to do with labor and even if you talked about education, that's a labor, education. (Laughs)

T: Would you like all these here or is there anything going to get knocked out?

(There are approximately two more pages of labeling remaining groups, deciding what to title, what to leave out, etc.)

T: Well then, we have it. The first one was LAND FEATURES AND CLIMATE; the next one we did was EDUCATION; FARMING AND ITS DIFFICULTIES; and the last one TOWNS AND CITIES. Does anybody see anything else we could have done if we'd had time to make another column? Is there something else we could have started rolling?

ANALYSIS EXERCISE, SOUTH AMERICA

T: Now, this is the question we're working with: "What differences would you expect to find if you went to live in South America?"

62: They probably have huts instead of houses.

T: All right.

13: In some parts there would be cooler homes.

T: You mean the insides of the homes would be cooler than ours or....

13: Wouldn't be so hot.

T: Is there another way you could sort of express that...cooler homes?

13: I don't know a much better way to say it.

T: Well, the weather would be much warmer there.

61: They wouldn't have any appliances like we have.

58: Different foods. They have different kinds.

T: Different kinds of food.

6: Less populated.

57: There would be a difference in the climate.

T: Difference in the climate.

10: The land features would be different.

T: Different. You mean they would be strange? Or...

10: Well, they have different, more of some things and more of other things than we have here.

T: All right. Land features different. Can you say it any other way?

10: I don't even know any other way.

T: O.K. Land features different. All right.

5: There would be lots less roads.

14: Some places they would not have water faucets.

53: Well, probably in the cities they'd have, the clothes are the same, but in the mountains they're quite different.

Analysis Exercise, South America

9: Well, there would be different diseases.

2: Well, I think the main problem with me would be that the language would be different.

T: Language different. All right.

60: I would think there would be more farming than here.

8: More animals.

T: Wild or...?

8: Wild.

7: Different animals.

12: Well, they run their country different.

11: They celebrate holidays different ways. Different ways than we do.

T: Holidays celebrated differently than ours.

13: Different schools.

T: What do you mean by different schools?

13: They're supposed to be different than ours.

T: You mean run on a different system than ours?

13: Yeah.

15: There would be fewer schools.

54: Difficulties with insects.

1: Different flags.

9: They are not as rich.

53: Well, they progress very little.

12: Their cities are smaller.

61: They wouldn't have cars in the little towns and villages.

62: Well, the people are farmers and there aren't enough jobs for them. There are more farmers than people who work, work in big business.

T: Umm, haven't we said something here already about, well, there's more farming. All right, more farming than big business. Is that what you want to say?

62: I guess so.

T: Well, who was it that said that? Shall we add hers to this one? Is she going along in the same area you are?

57: In the little villages in the jungle, water would probably be used as main transportation.

6: Customs different.

T: Do we have that at all here?

Several: Yes.

T: Well, we don't have it as such, do we?

9: Well, they're educated differently. Probably not too many times they're probably not educated like arithmetic too much, probably mostly educated how to farm.

5: There are different holidays.

12: Well, I was just reading that farming may be a subject in education. I was just going to say that you could say that their, their education, they don't have as good an education.

12: Poor schools.

T: Pardon me? Poorer education? Is that all right?

12: Umm. Hum.

2: Well, there's a girl in my classroom last year that came from South America and she said that they had, almost all day, they were in school. And that they went home at night and studied at home at night.

T: Well, how do you want it put down?

2: Well, it's really not that much poorer education.

T: In other words, you disagree with this one?

60: Actually, I think that probably the girl who came in our class was one out of not so many who got to go to school. There's a lot of people who don't get to go to as good a school as she got to go to.

T: You think she was kind of an exception?

60: Well, I don't think that all the kids in South America have as long a day and as good schools as she said she did.

10: Kathy, the girl from South America, came from the city, that might be....

Analysis Exercise, South America

T: She might be from a wealthy family?

10: Yeah, she lived in a big city.

T: This could have to do with the quality of education.

62: Well, probably just some people, probably half of the people, have had a good education. But some of them live in the jungle and the tropical places, but some people live in the big cities, like the capital of Argentina. That's where Rosie's from, the girl who lived next door to us last year, she came from there and she was, she had skipped about two grades when she came over here.

T: Well, could we put something down, would that information be background?

10: When they're in the big cities, they get better education, but on the farm there's hardly any education but farming.

T: All right, let's see, city educated better than country.

11: There are not as many stores.

61: Well, lots of the kids would do, well, not really hard work, but they'd be working like...we always have a lot of play time, but compared to them they're always helping around the house, and going to the store....

T: How am I to say that?

61: I don't know. They have to work most of the time.

T: Children have to work most of the time?

61: More than we do.

T: These people whose hands haven't been coming up, are they blank on the subject or just not used to saying too much in class discussion? This is something I would like to encourage if possible.

3: A lot of progress in cities, big cities, tall buildings.

6: There's more jungle in South America so there's more poorer schools. 'Cause most of it's jungle, not all of it, but most of it is.

T: Let's have one more.

60: Well, it's more drier.

T: Drier, do you disagree?

9: Yeah, I think it would be humid.

T: Humid, well, when she said dry do you mean in actual air around you or do you mean in rainfall?

60: I don't know what I mean. I just think that it would be more hot. I mean hotter, but it would be more dry because....

T: Well, you could say what you want. Do you want it to be the air drier or moister than it is here or do you want it to mean rainfall, more rainfall for them to have?

60: Well, I think that the land should be dry.

T: The land itself, the surface of the land would be drier. Now, I wonder, are there any connecting ideas between these, (pointing to the list) any relation between any of those things at all? Can we bunch these things together, or are they all pretty well single topics that go by themselves?

5: Jungles make running schools difficult and schools run differently.

T: One at a time, which one?

5: Well, schools run differently.

T: Schools run differently.

5: Are we putting them under a heading?

T: We're just sort of bunching them together right at the moment. Let's carry on with this bunch here. Anybody else want to group anything with this?

6: Poorer schools.

11: Poorer education.

58: Not so many schools.

60: Jungles make good schools difficult.

4: Farming main subject in school.

13: City education probably better than country.

T: Any others?

8: Not as many people.

T: Not as many people. Do you want that one here?

13: You could say less populated instead of that, make it shorter.

6: Are you putting that in school? That's not school.

T: You don't want that with school?

5: It's not about school except there's people in school.

T: Well, we wanted to use what we have there.

6: Less populated schools.

T: What do we have...less populated? Is that it? Now, are there any more? Is there anything else we can put together?

11: The weather's warmer.

3: Cooler homes.

58: Land surface is drier.

60: Climate different.

14: Land features different.

11: I don't think land features should go there because we were talking about the dryness and the climate.

43: Well, there's land surface drier...the landscape would bring in colder climates than warmer climates, they have other land features.

T: So you think that the dryness of the surface has to do with the features of the land?

43: Yes.

T: All right, anyone else want to voice an opinion whether we leave this or take it out?

6: Well, I think land features means more like mountains, so I don't think it belongs in there.

T: What 43 is saying is that because of these land features you would have these differences in weather. I think...is that what you're saying, because of these differences in land features you have a difference in weather?

43: Well, like in Greece, in one area they had one kind of tree and in another area, they have another kind, or when it's more mountainous, it's colder.

T: Well, that's acceptable to me.

11: Well, the land surface drier, that has to do with the weather because it makes it that way, but if you put it in land features, then you can put in less roads and stuff like that because it's part of the features of the land.

T: Well, we can. In other words, it looks to me as if things are changing a bit here, but at the same time a good part of the class seems to think that this is okay in here.

9: Well, you have heat, that's okay because heat does change land.

T: Well, I'll leave it there unless it looks like.... Now, if you want to add anything more to this list, do you have another one?

61: Fewer, less roads.

T: Less roads, this is the one that 11 warned us about.

61: Not in that one.

T: Oh, you mean you want to try something else? All right.

3: Some places, there aren't water faucets.

53: Water main transportation of the villages.

11: No appliances like we have.

T: No appliances, do you want to put that up?

11: I think it does because that's a convenience, and without water faucets, that's a convenience.

14: Appliances could mean all different kinds of things, like kitchen equipment. It doesn't have to do with weather or....

T: Maybe we're sort of veering off here. Do you want to leave it the way it is? Six, you seem to be outvoted. I'm trying to hold an election. Shall we leave this then for a time or do you want to....

3: Clothes different in the city as compared with the mountains.

61: What does clothes have to do with the climate?

5: Well, you wear cooler clothes, you wear clothes that keep you, like white clothes in jungles and things and then up in the mountains you wear heavy clothes, and a lot of blankets....

T: All right. Shall we try another, if there is another bunch, and see if we have something after that?

60: More farming than big business.

T: Anything else? Is that the only one in that bunch?

58: Well, you could put "farming" a subject in education.

T: Okay, is that the entire lot now?

55: The children have to work more than we do. Would that be one?

T: I don't know. Is that all right? You're the one that put it up there.

55: I think it is, because a lot of times the children that have to work harder, they're usually the ones who live on the farm.

2: Not as many stores.

T: This is fitting in here. It's not essential to get the same number in each area, necessarily. Whenever you want to call a halt, we can.

9: Different animals.

53: More wild animals.

60: I don't think that if there's going to be wild animals that there would be wild animals in the jungles and not on the farms.

T: What do you think? Is this farming that you're picturing or....

53: Well, where there's farms there are wild animals too.... I mean where there's farms there are some wild animals.

T: Well, let's see, what did you want me to put here?

60: More wild animals.

9: Difficulty with insects.

61: Huts instead of houses.

8: Poorer education.

T: Poorer education? Well, it's possible...I mean just because we have it listed already doesn't mean we can't use it again.

55: Building progress in big cities.

58: Cars not found in small towns and villages.

T: (begins to point to the groupings) Do you have something planned for a word...maybe we had better try to top these. Can you do anything with this, got anything you might name it, call it?

10: Well, if you took out that clothing business and that water for transportation, then you could have the CLIMATE.

T: Yeah, remember this doesn't just have to be one word or a pair....

10: You could have CLIMATE AND LAND FEATURES.

T: Would these things fit in under climate and land features?

Many: Yes, yes.

10: Well, that clothing wouldn't.

T: Five felt that the climate has to do a great deal with the kind of clothes they wear.

10: But you only study about the climate, you don't study about the clothes they wear.

T: You mean you haven't had experience doing this in school so far? Is this what you're saying or you really don't think that they would....

10: I really don't think that clothing goes together with climate.

12: Well, if it was snowing you couldn't run around in a bathing suit.

T: But we're talking about clothes as affected by the area. Well, too many people seem to think that this has something to do with it.

62: I think that clothes goes with climate because the, well, like Ten said, because you can't, well, if you didn't, you couldn't wear a bathing suit in the winter when it was snowing and you had to wear something real warm.

T: Well, it seems to me we have a general agreement on this. Ten is a little disturbed that mountains and sweat shirts should go together, I guess. What about CLIMATE then?

52: Well, I think climate should be the heading.

T: Just plain CLIMATE? Is that right? Do you want to do anything else?

58: You could say WEATHER CLIMATE.

T: Isn't this sort of like saying just plain CLIMATES?

53: NATURAL RESOURCES AND CLIMATE.

57: I don't think the water faucet should be in there.

T: I think that disturbed you the way sweat shirts are disturbing Ten.

57: Well, if you have it under CLIMATE, what does water faucets have to do with climate?

10: When it's real hot and there's no lake for miles around you aren't going to have water faucets around, but if you've got a real good well down at the end of the road....

57: I still don't think it belongs there.

Analysis Exercise, South America

T: Well, should CLIMATE be it? Anything else other than CLIMATE that would probably be good enough?

60: We could have LAND FEATURES AND CLIMATE.

T: LAND FEATURES AND CLIMATE. Is that all right? (points to another group.)

12: Education.

10: Well, how does education fit in with poorer schools?

T: You mean because the school isn't there, how can you have any education? EDUCATION, everything under here presumably should have to do with this subject. Doesn't poorer schools have to do with that?

10: I said it was a poorer school. I didn't say it wasn't a school.

12: I think SCHOOLING is better.

T: Well, EDUCATION seems to be generally accepted. I suppose that the words say about the same thing. However, if you were doing it, you would be perfectly okay to use it.

This is the big one. What are we going to do with that one? More farming than big business, children have to work harder, what do you want to have for a title there?

2: DIFFERENT KINDS OF LABOR?

T: It sounds like a good title. Is there anything there to fit under that?

2: Well, more farms than big business has to do with labor and farm and management. The subject, EDUCATION, has to do with labor and even if you talked about education, that's a labor, education. (Laughs)

T: Would you like all these here or is there anything going to get knocked out?

(There are approximately two more pages of labeling remaining groups, deciding what to title, what to leave out, etc.)

T: Well, then, we have it. The first one was LAND FEATURES AND CLIMATE; the next one we did was EDUCATION; FARMING AND ITS DIFFICULTIES; and the last one TOWNS AND CITIES. Does anybody see anything else we could have done if we'd had time to make another column? Is there something else we could have started rolling?

CONCEPT DIAGNOSIS
LABORATORY EXPERIENCE

Content:	Participants are assigned in teams to teach the thinking process of concept diagnosis. One member teaches, the other(s) observes and records data. Following the lesson the teacher is provided with objective feedback of the events of the lesson.
Leadership Materials:	Concept Diagnosis, Leadership Notes Special Note to Leaders
Participant Materials:	Concept Diagnosis Observation Guide
Rationale:	To provide intellectual and emotional experiences to insure accommodation of skills to personal teaching style To develop skills in obtaining and utilizing systematic and objective data
Objective:	Following the teaching of concept diagnosis under observation, with systematic and objective feedback on the events of the lesson, each participant will demonstrate the accommodation of the process of his teaching style by subsequently utilizing the process in future teaching activities.

It must be recognized that the laboratory experience part of the training program creates participant anxiety. The thought of teaching a new skill, under observation, with feedback on behavior is at least initially threatening to most participants. However, the laboratory experience is considered an ESSENTIAL component of the training program. It has been found to be the one most significant factor in creating teacher competency with the thinking processes. Very simply, without the laboratory experience, behavior does not change--with the laboratory experience, it does. Also, despite the feeling of threat, almost without exception, participants experience success and demonstrate a growing comfort with working together in a team approach.

The directions below are intended to present suggested procedures for implementation within all three of the alternate instructional formats:

I. Workshop
II. Extension Course
III. Methods Course

Sequence	Time	Group	Activity
A			Preinstructional Planning 1. See the specific instructions in the section, Preinstructional Arrangements, pages 29-34.
B	15	SG	Assignment of Laboratory Experience 1. Announce specific assignments: Time

Location

Team members

One may save time and confusion by using a previously developed assignment sheet to have assignments ready for distribution.

2. Refer to Concept Diagnosis Observation Guide.

3. Discuss Data-Collection Roles
    a. In the case of both the workshop and extension course formats, one teaches and the other observes and takes data using the Concept Diagnosis Observation Guide as the instrument for collecting specific data. In the case of microteaching, two participants take data.
    b. Caution participants to avoid value judgments in data collection. Attempt to collect valid, objective and specific evidence of behavior.

Not: "Many pupils responded."

Instead: "Nineteen out of twenty pupils responded."

Sequence	Time	Group	Activity
			c. Review the Concept Diagnosis Observation Guide and discuss any questions or concerns.
			4. Review Critique Procedure
			a. Following each teaching session, team members will confer. Utilizing the Concept Diagnosis Observation Guide, the observer(s) will give feedback to the teacher concerning the events of the lesson.
			b. AVOID VALUE JUDGMENTS Don't tell a teacher that it was a "good" or a "bad" lesson. Tell him what happened and let him judge for himself. The critique session should be a joint inquiry into the data with an analysis of cause and effect relationships.
			5. Advise participants to do the following:
			a. Be at assignment a few minutes in advance.
			b. Confer briefly with the classroom

Sequence	Time	Group	Activity
			teacher. Invite him to observe if he likes, but if he does not wish to remain in the room, determine where you can find him in case you finish before the period is over.
D	60-180	Schools	Laboratory Experience 1. Participants will spend the appropriate period of time operating as teams in the teaching practicum. (This is a particularly good time for the instructional leaders to meet together for planning.)
E	30	SG	Reaction to Laboratory Experience 1. This is a very important session. Participants will be emotionally wrung out at this point, but still stimulated to talk about what happened. The session's greatest value is in "sharing." If it seems advisable, use the observation guide in conducting the discussion, but allow time for participants to unload both ideas and feelings.

Sequence	Time	Group	Activity
			2. Do not expect to continue for an extended period of time during the day beyond this point. Participants will be far too emotionally exhausted to give full attention.

SPECIAL NOTE TO LEADERS

It is suggested the following points not be discussed unless it seems necessary. However, some emotional letdown from the laboratory experience with concept diagnosis may exist. At this point, you may have some negative participant reaction to spending so much time with a process that may seem to have somewhat limited application. Point out the following reasons for doing so:

1. Much of the time was devoted to rationale and a knowledge base applicable to all thinking processes.
2. Since concept diagnosis is not a complicated strategy, it represented a fail-safe experience for a participant's initial laboratory experience.
3. The discussion skills utilized for concept diagnosis were the focal point for learning since they are basic to all of the strategies.
4. Finally, even though concept diagnosis has limited application, the element of verbalizing relationships is basic to all subsequent thought processes.

CONCEPT DIAGNOSIS
OBSERVATION GUIDE

Teacher ______________________

Observer ______________________

Grade & Subject ______________

I. Listing Question ____

____

Tally the number of times that the following behavior was observed:

Extended period of silence ______________________

Refocusing the discussion ______________________

Encouraging pupil participation ______________________

Pursuing for additional information ______________________

Asking for clarification ______________________

Asking for summarization ______________________

____

None (Pupil Participation) 100 Percent

II. Grouping Question ____

____

Tally the number of times that the following behavior was observed:

Students grouped on descriptional basis ______________________

Students grouped on abstract basis ______________________

Teacher asked for basis of grouping ______________________

Teacher handled disagreements by:

Dropping (Moved away from disagreement without solution) ______________________

Tabling (Set disagreement aside for future consideration) ______________________

Voting (Called for vote to resolve disagreement) ______________________

Intervening (Teacher imposed solution) ____________

Solving (Led discussion to point where students resolved disagreement with apparent mutual satisfaction) ____________

III. Labeling Question ____

____

Tally the following:

Number of groups with just one label ____________

Number of groups with more than one label ____________

Number of times items were regrouped in order to fit a label ____________

Number of times items were verified as fitting the label(s) ____________

____

None (Pupil Participation) 100 Percent

IV. Following the observation, indicate below what you feel you now know about this group of students.

INSTRUCTOR'S MANUAL:

DEVELOPMENT OF HIGHER LEVEL THINKING ABILITIES

Part II

Northwest Regional Educational Laboratory

Interpretation of Data

SENSITIVITY TO INTERPRETATION OF DATA: LITERATURE

Content:	Small group activity: Leader will read *The Golden Crane* and lead participants through a sensitivity experience to interpretation of data, literature.
Leadership Materials:	Sensitivity to Interpretation of Data, Leadership Notes
Participant Materials:	*The Golden Crane* (Leader may wish to present this story orally)
Rationale:	To develop sensitivity to interpretation of data processes
Objectives:	During the process of role playing the interpretation of story content for feelings, participants will demonstrate their emotional and intellectual involvement by participating verbally in the activity, and subsequent to the experience, by expressing their reactions to the encounter.

Sequence	Time	Group	Activity
A	60	SG	Interpretation of The Golden Crane

1. Indicate this will be a sensitivity experience in interpretation of data in which participants will listen to a story and then role play a classroom discussion. However, indicate that they need not make their responses child-like. Suggest, at this point, they relax and listen to a beautiful Japanese folktale.
2. A copy of *The Golden Crane* is available in the participant materials. You may either read it aloud or give participants time to read it silently to themselves.
3. Ask, "What happened in the story?" as an open-memory question to elicit responses from many members. (You may be aware of some discomfort in their responding to this question. Unlike small children, adults and older students are concerned about what you want as a response, and this type of wide-open question is a bit frightening until they learn to trust you.)

Sequence Time Group Activity

a. Focusing Memory Questions:

1. "What happened that told you how Toshi felt about the golden bird?"
2. "What happened that told you how the other people felt about the bird?"

b. Interpretation Questions:

"Why do you suppose the feelings among the villagers were different from those of Oji-san and Toshi?"

These are designed to get at the difference in values among the characters in the story by examining their feelings toward the bird.

c. Inclusive-Interpretation Questions:

"Do you think this story has a meaning to it?"

If a response is given without an explanation, ask, "Why do you think so?"

B 15 SG Analysis of Process

1. Following the sensitivity experience, conduct a discussion, as indicated by the following question sequence, for the purpose of analyzing the emotional

Sequence	Time	Group	Activity
			and intellectual processes experienced by the participants.

a. "How did you feel while going through this process?"

b. "What intellectual processes were required in responding to the questions?"

   Recall of information about the story; determining cause and effect relationships; generalizing or inferring about the meaning of the story

c. "What purpose would you have for using a story and question sequence such as this with a group of students?"

   Anticipate a variety of responses, but focus on the purpose of utilizing such a story to provide experience in interpretation of values and feelings

d. If, in the discussion above, the purpose of utilizing the story for the factual content is not discussed, ask, "For what other purpose could this story have been used?"

   Factual content, rather than emotional content--occupations of villagers, type of government, etc.

THE GOLDEN CRANE[1]

by Tohr Yamaguchi

At last the terrible spring storm was over and the thatched roofs, wet from the rain, shone in the morning sunshine. The sudden storm had assaulted everything with pouring rains and gushing winds and then--gone!--off to the North ahead of the morning. It had been like a nightmare.

The shore of the little village was littered with driftwood, seaweed, torn trees, upturned boats and torn fishing nets.

"What a storm it was!" cried Hayato. "It hit my house with a falling oak tree!"

"My boat is gone," said Kenkichi, pointing to the broken, iron boat hook. "The waves dashed it to pieces...after all my work to pay for it!"

The two men stood discouraged and brokenhearted. And there were many others. A crowd of villagers had gathered on the shore awaiting news of the fishermen who had been caught at sea in the storm. Some of the villagers lay on the cold ground huddled under their wet straw capes and rain hats. Others stood looking hopelessly out to sea.

Old Sasuke first saw the rescue party returning. He pointed to a boat rounding the cove. "They are returning! See! They come!" he shouted.

The boat proceeded slowly past the Maiguri rocks and on through the grey, churning water to the beach.

"Only a handful of fishermen survived," the men reported sadly. "The rest surely are gone into the sea forever. They had little chance in such a storm.

---

[1] From Wise Owl Books Series, General Editor, Bill Martin, Jr. Copyright © 1965, published by Holt, Rinehart and Winston, Inc. Reprinted by special permission of the publishers, Holt, Rinehart and Winston, Inc.

The Golden Crane

The news was not unexpected. The waves had been wild and angry. Yet the little band of villagers waited through the day, hoping that their loved ones, by some miracle, might return.

As the sad day came to an end, the sun hemmed the scattered clouds with red and orange threads. The evening air felt deep and cold as the waves continued their pounding on the shore. Some of the villagers gave up their watch and walked home, brokenhearted. A few, however, refused to leave. Little Toshi was among them.

Little Toshi lost his father in the storm that day, his only family.

"Poor boy! Now he has no one in the whole world. All alone now!" The villagers pitied Toshi because he had been born deaf and dumb. Now they pitied him more because his father had been taken from him by the cruel sea.

Toshi joined a circle of friends sitting around a bonfire on the wet shore. The warmth of the fire dried his tears until more tears spilled down his cheeks.

"Ooooora, ooooora! Tooo-shi!" An old man came toward the fire, raising his red lantern in his hand. His hair and beard were like long, white silk threads. "Toshi, you are here?.... Sa, sa, you come with me so you won't catch cold. You come live with me."

It was Oji-san, an old white-bearded fisherman, Toshi's friend. He looked earnestly into Toshi's face and nodded slowly, knowing all the inside of Toshi's heart. He gently hugged the boy in his large, comfortable arms. "Don't cry, Toshi...don't. You come...live with me...from now on."

The Golden Crane

Oji-san put his long white robe over Toshi's shoulders and wiped Toshi's cheek with his hand. Then the old man and the boy bowed goodbye to those who still were waiting and started home. The red lantern in Toshi's hand lighted their way up the dark hillside.

From that sad night, Toshi and Oji-san lived together in Oji-san's tiny thatched hut on the hill above the village of Tojin-mura.

Oji-san was a fisherman, a very good one. He left the hut early each evening to go out with the fishing fleet in his tiny boat with the proud yellow flag. All through the night he fished the deep waters of the sea. When he returned to the shore with his catch of fish, Toshi was there to help him unload the fish and care for the boat.

Many other boys gathered on the shore in the darkness of early morning, carrying bamboo baskets on their shoulders. They, too, were fisherman helpers. As they waited for the boats to arrive, they sat around a warm bonfire, talking quietly.

Toshi often left the others to walk up to the Hachiman Shrine that stood high on a lava rock overlooking the village and the sea. There he waited expectantly for the sunrise and the flight of the golden cranes. Like everyone in the village, he loved the beautiful birds that adorned the morning sky.

The plovers arrived first, just before sunrise. Sweeping over the dark green waves with a shower of twittering, they circled the shore in thousands. Then they rushed off through the shadows of the Maiguri rocks to herald the sunrise. The eastern sky grew bright orange, very orange--red, very red--then gold, very gold, sparkling gold!

The Golden Crane

At that moment of each morning they came--hundreds and hundreds of golden cranes flying gracefully toward the rising sun! The heavens burst with splendor! The cranes' outstretched wings glittered in the sky like fluttering gold foil! The sky, the sea, and the mountains splendidly reflected the gold!

In the glory of the morning, Toshi sometimes raised his hands to the golden birds as if to say "Oh, beautiful cranes! I adore you!"

One morning in June the drums from the fishing boats sounded in the harbor:

Dong, dong, ta, ta, ta!
Dong, dong, ta, ta, ta!

Oji-san's face was full of happiness. He had hoisted his yellow flag proudly to the top of the mast. That meant a big catch. His little boat was filled with fish--large ones, small ones, squids, octopuses, and lobsters.

"Toshi-bo! Bring the baskets! I have something fine for the market today. Come see!"

Toshi ran to Oji-san, his black eyes flashing. He pointed first to the sky, then to the Hachiman Shrine.

"I know, Toshi, you have seen the birds again," said Oji-san, pulling the bamboo baskets near the boat to unload the catch. "I saw them, too."

Toshi pulled at Oji-san's tattered sleeve and tried harder to make the old man understand.

"What's the matter, little friend?" Oji-san studied Toshi's worried face. "Very well, show me what's wrong."

Toshi led the old man across the beach and up the road to the Hachiman Shrine. As they neared the red torii gate, Toshi ran ahead and pointed the way.

The Golden Crane

"Oh Tooo-shi! A golden bird! Wounded!"

There near the long red-white rope that rang the brass bells of the shrine lay a golden crane. One of its wings was wounded. Oji-san put his cotton sash over the bird and gently lifted it in his arms.

"We must take the bird home and care for its wound," said Oji-san. "But first, we will ask Jiro to take care of our fish today."

When they arrived home, the crane was laid on a silk cushion in the corner of the hut. Its beautiful feathers reflected the morning light.

"Now, Toshi, we will make an ointment of the poppy seeds and chrysanthemum roots. That should comfort the pain," said Oji-san.

He took down a kettle of warm water from the fireplace and began mixing the ointment. Toshi knelt beside the cushion and held forth a piece of dried shrimp. The crane pecked Toshi's hand gently with its long brown bill, but it was too ill to eat.

When Oji-san had dressed the crane's wound, he laid the bird nearer the fire. In a short time the crane became quiet and slept.

Three days passed without any sign of the crane's improvement. Then on the fourth morning, the bird ate a piece of white fish from Toshi's outstretched hand. That was the first good sign. Oji-san and Toshi were further encouraged when the crane walked a bit and gently flapped its wings as if trying to fly.

"Look, Toshi," said Oji-san. "The beautiful bird is getting well. Soon he will join his brothers in the sky."

In short time the news of the golden crane reached every ear in the village. It then spread quickly from Tojin-mura to neighboring villages, from neighboring villages to larger towns, and finally to the capital city. The people were greatly excited. Everyone had seen the golden cranes flying high but none had seen one of the holy birds at hand.

The Golden Crane

"No, not anyone! Not even the Emperor!" said an old lady who sold flowers at the palace gate.

"This holy bird speaks the message of God!" said another. "It is indeed a miracle!"

"We must go see the bird for ourselves," said the toy vendor. "Besides, business will be good at the fisherman's hut where the bird has appeared."

Pilgrims soon filled the roads leading to Tojin-mura. Noisy crowds of people appeared in the little fishing village, clamoring to see the holy bird. They pushed through the wild cherries that grew around Oji-san's hut, and overran the garden for a glimpse of the golden crane.

"How beautiful!" they exclaimed. "It is like a golden light!"

Some tried to touch the crane and steal a feather or two--pure gold, after all!

The crowds of curious people trampled through the bushes and the flowers and the stream that ran through the garden. The beautiful cherry trees withered as more and more people climbed into the branches for a peep inside the hut.

Even the holy Hachiman Shrine became an eating and resting place for the throngs of pilgrims. The entire village was overrun with visitors.

One day a very rich man attended by many servants came from a city to see Oji-san. He arrived in a cart decorated with carved ivory and precious stones and drawn by six white oxen. The windows of the cart were framed with perfume trees and the floor was covered with silk tatami mats. Oji-san bowed very low to bid the visitor welcome.

The Golden Crane

"I come to buy the holy bird," the rich man said from the cart window. "My servants bring my offering of twenty boxes of gold coins."

Oji-san was bewildered by the sight. It was more gold than forty fishermen like him could expect to see in a lifetime.

"You cannot afford to miss such an opportunity as this," said the rich man.

"Your excellency..." Oji-san bowed his head in apology, "the bird does not belong to me...I am sorry, sir."

Another day, the Lord Governor and his followers came to visit the golden crane. The Lord Governor was at once enchanted with its beauty and promised to appoint Oji-san the Mayor of Tojin-mura in return for the golden bird.

"Your honorable Lord Governor...I am most honored...this is most honorable...very fortunately the bird belongs to the heavens...I am powerless," Oji-san barely managed to speak through his trembling.

When the crowds of people heard that Oji-san would not sell the golden crane, they whispered, "What a fool! Oji-san and dummy Toshi! Stubborn! like rocks!"

Both Oji-san and Toshi feared what might happen to the golden crane. They were not afraid for themselves but they trembled at the thought of the beautiful crane being caged. Day by day they helped the bird to spread and try its wings. But, no, it still was too weak to fly.

Then one fine day a nobleman wearing a long, mauve silk gown and a black hat arrived in Tojin-mura. He was accompanied by a hundred elite warriors dressed in full splendor. Their beautiful armors hung heavily on their strong shoulders and their ornate swords and spears glittered in the sun. The people were awed to see such a sight.

The Golden Crane

They bowed their heads deeply as the nobleman, riding a beautiful white horse, led the march through the village. He carried the flag of the Imperial High Court, a small bright red flag embroidered with a golden chrysanthemum.

The procession stopped at the door of the hut where Oji-san and Toshi bade the men welcome. Then the noblemen took a scroll from his jeweled saddle bag and read:

"Prince Hikari delivers the Imperial Order from the Supernal Emperor! His Imperial Highness desires to add the golden crane to the Imperial Treasure."

Oji-san wanted to cry out, but he remained silent. Because he was a fisherman of the low class, he was prohibited by law to address a nobleman of the Imperial High Court.

The nobleman continued reading: "The golden crane will be presented to the Emperor at dawn tomorrow."

"...Your Highness, this...but..." Oji-san trembled because he had dared to speak.

"Be silent!" The nobleman struck Oji-san with an ivory stick and the old man fell to the ground. Toshi did not understand what was happening, but he ran through the lashes of the stick to try to help Oji-san.

"Obey!" said the nobleman. "Obey this order of the Imperial Majesty! The Emperor himself will come at dawn tomorrow to receive the golden crane!"

To make himself better understood, the Prince ordered Oji-san and Toshi under arrest. The soldiers tied them and kicked them into the corner of the hut.

The Golden Crane

"The Emperor is coming!
The Emperor is coming!"

The little fishing village received the news with wild excitement. Men and boys set to sweeping the main road and washing the bridges. Women gathered to prepare a huge feast for Prince Hikari and his warriors. Nothing like this had ever happened before to Tojin-mura. Everyone was happy about it except Oji-san and little Toshi. They spent a painful night worrying about the morrow.

The following morning dawned slowly like any other day. The roosters crowed high and proud from the hilltop, and the plovers flew in from the sea with a burst of twittering. The villagers and the pilgrims already had gathered along the streets to welcome the Emperor and his entourage. More of them had scarcely slept through the night. They dared not be late on so great an occasion.

Just as the stars were fading in the morning twilight, the Emperor's coming was announced by drums and bells:

Dum! da, da, dum, dum, dum!
Goon! goon! goon! goon!

Down the road came the troops, marching slowly and solemnly on either side of the Imperial Carriage. It was a magnificent procession of men, with spears and flags rising sharply against the horizon.

The eastern sky became orange, bright orange fringed with red. Then the sun appeared: gold, gold, sparkling gold. At that moment, as always, the sky filled with golden cranes. They flew gently eastward, then suddenly turned toward the village. The heavens brightened like a fountain of fire.

The Golden Crane

Swords and spears and banners fell to the ground in disarray as people hid their faces in their arms. Even the Emperor was forced to look away as the holy birds came nearer and nearer the village. The only sound was the quiet rustling of their wings.

Then a child's voice broke the stillness. Lifting his hands in praise, Toshi cried aloud, "Oh, beautiful birds, I adore you!"

When the bewildered people awaked from their fears, the wounded bird and all of the other cranes were gone. And Oji-san and Toshi were also gone.

The golden cranes were flying out over the sea into the bright light of morning. Borne among them, in the golden burst of fluttering wings, were the old fisherman and little Toshi.

Slowly they disappeared forever in the enfolding light of the rising sun.

PROCESSES IN INTERPRETATION OF DATA

Content:	A large group, knowledge base presentation is given including the theory and techniques for implementing the processes in interpretation of data.
Leadership Materials:	Processes in Interpretation of Data, Leadership Notes
Participant Materials:	Processes in Interpretation of Data
Rationale:	To provide a knowledge base of theory and techniques to which subsequent activities will be related
Objective:	Following a large group, formal presentation on the theory and techniques for the process of interpretation of data, participants will demonstrate understanding of theory and techniques by successfully completing the subsequent activities.

The purpose of this presentation is to provide a knowledge base for the subsequent simulation and laboratory experiences. It may be conducted in one of two ways.

I. Illustrated Lecture

II. Reading of Processes in Interpretation of Data

Sequence	Time	Group	Activity
I	30	LG	Illustrated Lecture For those leaders who feel quite secure with the content and processes of this instructional program, it is recommended they develop their own individual presentation, incorporating within it the specific theory and techniques that are presented in the following material.
II	30	LG	Reading of Processes in Interpretation of Data Ask participants to read Processes in Interpretation of Data.

PROCESSES IN INTERPRETATION OF DATA

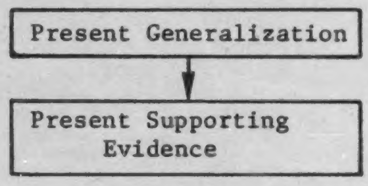
Rationale

As indicated previously, the explosion of knowledge has reached such proportions that all individuals, in order to cope with the world of today and the immediate future, must be capable of autonomous learning. For example, they must have the skills to acquire and analyze large bodies of information, to relate this information to their previously learned knowledge base, and to arrive at new generalizations and principles which are logically supported by the data. It is for this reason that all major curriculum development projects have been designed to implement what has usually been termed "the discovery approach." Discovery is simply interpretation of data. The major content of this instructional program centers on the development of this process. In order to understand the interpretation process, one should be familiar with the differences between two methods of teaching, the deductive and inductive approaches.

The *deductive process* is basically one of supplying the generalization and supporting factual information. Generally, an authority outside of the learner is demanded both for presenting the generalization and supplying the proof. Much of the content taught in school has been presented with this approach. Most textbooks present rules, definitions, principles and generalizations, then follow them with data which illustrate their validity. This is not to say that the approach should never be used. It may be an effective, expedient way of developing certain basic knowledge. However, research has clearly indicated that knowledge is retained longer and is transferred more effectively when acquired through the inductive approach.

Processes in Interpretation of Data

Deductive Process

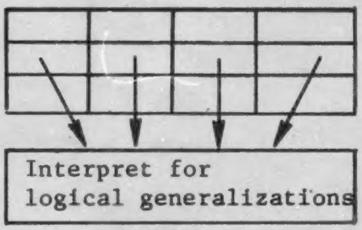


The Indians utilized the plants and animals of their environment for food.

(Factual data which verifies the generalization)

In the *inductive-interpretation process,* teaching is basically a procedure of moving from a series of concrete, specific encounters with factual data to a statement of conclusion which can be logically supported by the data. The teacher never states the generalizations. The students are asked to arrive at such statements from the basis of the known data.

Inductive-Interpretation Process



(Factual data organized in relation to conceptual categories.)

The Indians utilized the plants and animals of their environment for food.

As indicated on the chart below, the procedure which is followed in conducting this process calls for three levels of operation.

Interpretation of Data Procedure

	Purpose	Intellectual Operation	Questions
1.	Recall and analysis of specific data	Identifying and examining specific information selected from a body of factual data	How did Taro feel about his friend? What happened when we added acid? What industries were found?

Processes in Interpretation of Data

Interpretation of Data Procedure

	Purpose	Intellectual Operation	Questions
2.	Analysis statement of relationships	Drawing and explaining relationships between items of information	What differences do you see? How do you account for these differences?
3.	Statement of inclusive generalizations	Concluding and summarizing, by stating inclusive generalizations	What meaning does this have for you? What conclusion could we draw?

The first step in the above procedure is Analysis of Specifics. The intellectual operation called for is one of identifying and examining specific information selected from a body of factual data. The questions call for a focus upon, and an analysis of, specific information.

How did Taro feel about his friend?

What happened when we added acid?

What industries were found?

The second step, Analysis and Statement of Relationships, calls for an intellectual operation in which students are asked to draw and explain relationships between items of information. The questions ask the students to compare, contrast and relate specific items of information, and to explain the relationship.

What differences do you see?

How do you account for these differences?

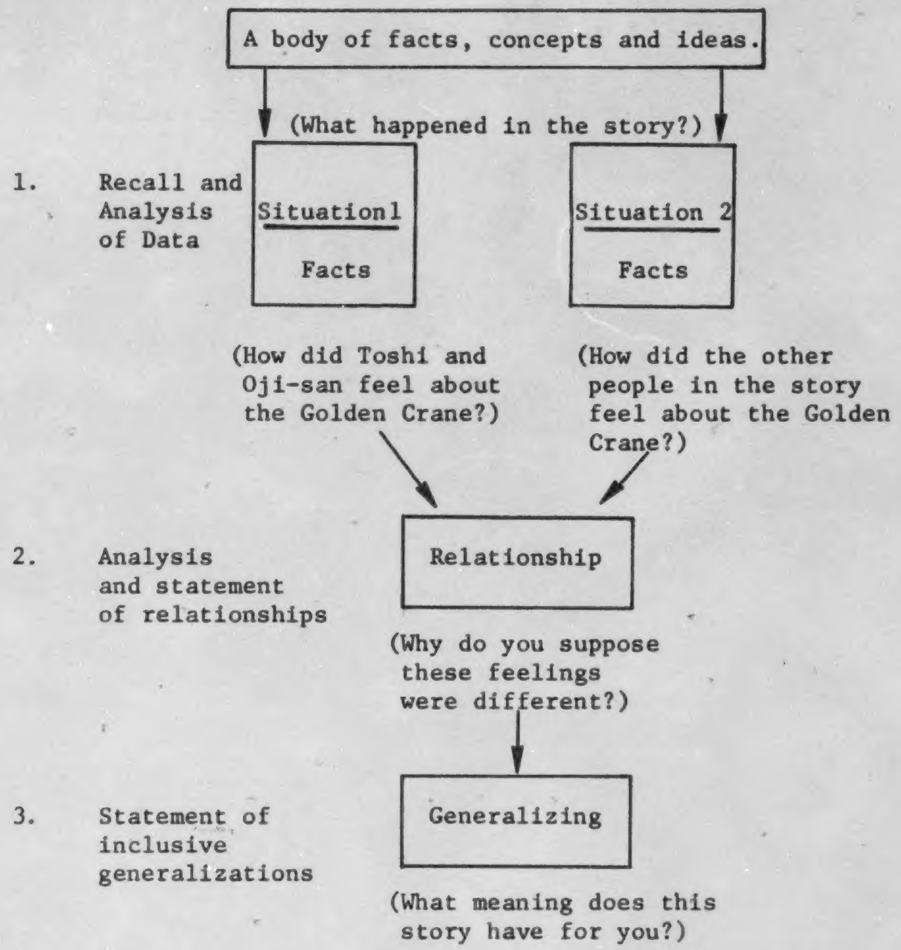
The third step, Statement of Inclusive Generalizations, calls for a culmination of the discussion. Students are asked to conclude, summarize, infer or generalize from known data. The question calls for this culmination.

What meaning does this story have for you?

What conclusion could we draw?

Processes in Interpretation of Data

The following chart illustrates the application of this process to the discussion of a story.


A body of facts, concepts and ideas.
(What happened in the story?)
1. Recall and Analysis of Data
Situation 1
Facts
Situation 2
Facts
(How did Toshi and Oji-san feel about the Golden Crane?)
(How did the other people in the story feel about the Golden Crane?)
2. Analysis and statement of relationships
Relationship
(Why do you suppose these feelings were different?)
3. Statement of inclusive generalizations
Generalizing
(What meaning does this story have for you?)

As indicated above, prior to the three steps of the interpretation process, an open question is asked which requires recall of a body of facts, concepts and ideas. For example, as illustrated above with *The Golden Crane*, students might be asked, "What happened in the story?" Asking this type of question, prior to the interpretation process, provides a base of specific information upon which to operate.

Processes in Interpretation of Data

A student is asked to Recall and Analyze Specific Data from this body of information. Here, one might ask two questions which focus on specific items of information. For Situation 1, the question might be, "How did Toshi and Oji-san feel about the Golden Crane?" For Situation 2, it could be, "How did the other people in the story feel about the Golden Crane?" Both questions call for discussion of specifics in the story. Moving from this identification and discussion of specific information, in the second step, Analysis and Statement of Relationships, students are asked to draw and explain a relationship.

Why do you suppose these feelings were different?

Having moved to the more abstract level of cause and effect relationships for the Statement of an Inclusive Generalization, students are asked to go beyond the literal recall and explanation of story content, to infer what significance the story has. The question asks, "What meaning does this story have for you?"

The inductive-interpretation of data process, then, is one of moving the students sequentially through a body of information calling first for recall and analysis of data; second, an analysis and statement of relationships between specifics; and, finally, for generalized statements which can be logically supported by the data.

Teaching Strategies

The questioning strategy for interpretation of data often begins, as indicated above, with an *Open-Memory Question.* One of the reasons for doing so is "to elicit a universe of facts, concepts and ideas upon which to operate." Often, after reading a story, viewing a film, listening to a resource speaker, returning from a field trip or just sharing researched information, it is very helpful to recall the events, share perceptions or review previously acquired information as a basis for discussion.

A second purpose for starting with an open-memory question is simply to provide an opportunity for every student to become involved initially in the discussion. Such a question is completely free of the element of "guess what's on my mind." It opens the discussion with any response the students wish to make without fear that the response will be judged. Examples of this type of question are:

What did you see in the film?

What happened in the story?

What did you see take place in the experiment?

What have we been able to find out about Bolivia?

The first of the discussion skills required is acceptance. Accept all responses in a nonjudgmental manner. The second is supporting, encourage students to become involved and express their ideas. Such teacher expressions as, "Take a minute to think" or "Go ahead, express it any way that you can," help support the student in his attempt to verbalize ideas. Also, avoid editorializing. Try not to take the student's response and change it into your own terminology--accept his ideas as he states them. Another factor in acceptance is the nonverbal cues you give to the class. Pacing up and down with snapping fingers can be as restrictive of thoughtful contemplation as the sharp comment, "Hurry it up!" Wait calmly--thinking takes time--don't rush the response. Remember, your purpose is to involve the students and get as much information as possible. In relation to this purpose, the third discussion skill, mapping is important. Attempt to gain as much information as possible. "Are there any other points that we have missed?"

The second type of question asked in the interpretation of data process is a *Focusing-Memory Question.* The focusing-memory question calls for recall and analysis of data. The objective, as indicated, is to provide the focus on specific points to be compared, contrasted and related to other points. Sometimes, rather than beginning a discussion with an open-memory question which calls for remembering or reading a field of data, the discussion may be initiated with a focusing-memory question. It may be more appropriate to zero in immediately on specific points. However, if an open-memory question is used to initiate the discussion, the focusing-memory question is invariably the second question in order to provide focus on specific data. Examples of this type of question are:

What did the film tell us about transportation?

What feelings did Taro express at this point in the film?

What happened when we added acid?

What industries do they have in this area?

The primary discussion skill used is substantiating. This is a basic discussion skill of the interpretation process and will be used throughout it. Essentially, the skill consists of asking the student to give evidence of the basis for his response. For example:

When you say Taro was angry, what were some of the things that he did or said in the story that made you feel this?

What happened that makes you believe the chemicals changed state?

What facts did you find that lead you to believe that Japan is industrialized?

Processes in Interpretation of Data

The next type of question called for is the *Interpretation Question.* This type of question is keyed to the basic intellectual activity within the interpretation of data process. The objective, as stated, is "to elicit comparing, contrasting and relating of specific points within the field of data." Considering interpretation as a process of "relating," the strategy called for is to "ask a question (or series of questions) which requires the students to draw relationships between two or more points in the data." Examples of this type of question are:

> How did Toshi and Oji-san feel about the Golden Crane that was different from how the others felt?
>
> What differences do you notice between these two groups?
>
> How do you account for the differences which you stated?

The basic discussion skill is substantiating. Asking for substantiation at this point calls for the student to support and/or refine the generalization he has expressed.

> What information do you see that supports the statement that industry depends on natural resources?
>
> Is this the only factor that industry depends on?

The final question in the interpretation of data process is the *Inclusive-Generalization Question.* Its purpose is to move the discussion to the verbalization high-level, inclusive abstractions. Following interpretative questions which focus on relationships, a question is asked which requires:

1. A conclusion: a statement produced as a result of reasoned judgment
2. A summary: a restatement of the main points of the discussion
3. Inferences: a statement based on a former statement which is held to be valid
4. Generalizations: an inclusive statement covering all aspects of the discussion; a generalization is supported by a firm foundation of data

Processes in Interpretation of Data

Examples of such questions are:

What conclusions could we draw from our discussion?

How could we summarize what this film has presented?

What could we say that might be true of other societies?

What could we say that this experiment has illustrated?

The primary discussion skill, again, is substantiating, asking for proof, particularly in cases where students have overgeneralized.

What did you see (note, read) that would support what you have said?

Would that be true under all circumstances?

How could you state it so that it fits most situations?

(Calling for a statement of condition, such as_____.
Based upon the information found_____.
Industry is largely dependent upon_____.
In most cases, _____.)

Finally, there are those discussion skills indicated below which are generic to any discussion:

Refocusing

Clarifying

Summarizing

Mapping

In conclusion, the point should be reemphasized that the interpretation of data process is the heart of the instructional program being presented. It is a process that can be utilized many times every day, in every curriculum area, at any grade level. Once students have acquired the skills to be able to analyze, organize and relate specific data, and to move beyond to inferences and generalizations which are logically supported, they have moved a considerable distance towards that ultimate goal--autonomous learning. The following outline is designed to serve as a guide for the planning of the interpretation of data process.

Processes in Interpretation of Data

Teaching Strategies

Open-Memory Question

Objectives: To elicit a universe of facts, concepts and ideas upon which to operate.

To provide an opportunity for every student to become involved initially in the discussion.

Ask an open question which calls for recall or reading of data from the field of information being interpreted.

What did you see in the film?

What happened in the story?

What did you see take place in the experiment?

What have we been able to find out about Bolivia?

Discussion Skills

Acceptance: Accept all responses in a nonjudgmental manner.

Supporting: Encourage students to become involved and to express their ideas.

Take a minute to think.

Go ahead, express it in any way that you can.

Avoid editorializing.

Nonverbal support, wait, don't rush the response.

Mapping: Attempt to gain as much information as possible.

Are there any points that we have missed?

Focusing-Memory Questions

Objective: To focus on specific points to be compared, contrasted and related to others.

Ask a question (or series of questions) which focuses upon specific data.

What did the film tell us about transportation?

What feelings did Taro express at this point in the film?

Processes in Interpretation of Data

What happened when we added acid?

What industries do they have in this area?

Discussion Skills

Substantiating: Ask the student to give evidence of the basis for his response. This is a basic discussion skill of the interpretation process.

When you say Taro was angry, what were some of the things that he did or said in the story that made you feel this?

What happened that makes you believe that the chemicals changed state?

What facts did you find that lead you to believe that Japan is industrialized?

Interpretation Questions

Objective: To elicit comparing, contrasting and relating of specific points within the field of data.

Ask a question (or series of questions) which requires the students to draw a relationship between two or more points in the data.

How did Toshi and Oji-san feel that was different from how the others felt?

How do you account for these differences?

Is there any relationship between the climate of this area and the farm products?

Discussion Skills

The main discussion skill, again, is substantiating. Ask the student(s) to support the response.

What happened in the story that makes you believe the others were more selfish than Toshi and Oji-san?

How do you account for the differences you stated?

Quite often, when an interpretive question is asked, a student will generalize. Examples are below:

What relationship do you see between the industries of this area and the natural resources?

Industry depends upon natural resources.

Processes in Interpretation of Data

Asking for substantiation at this point calls for the student to support and/or define the generalization.

What information do you see that supports the statement that industry depends on natural resources?

Is this the only factor that industry depends on?

Inclusive-Interpretation Question

Objective: To move the discussion to the verbalization of high-level abstractions.

Ask a question which calls for a conclusion, a summary, inferences or generalizations.

What conclusions could we draw from our discussion?

How could we summarize what this film has presented?

What could we say that might be true of other societies?

What generalization could you make that would include all the aspects we have discussed about Japan and India?

Discussion Skills

Substantiating: The basic discussion skill is asking for proof, particularly in the case where students have overgeneralized.

What did you (note, read) that would support what you have said?

Would that be true under all circumstances?

How could you state it so that it fits most situations?

Discussion Skills Generic to Any Discussion

Refocusing: The discussion moves off focus. Call it back.

Clarifying: Clarifying an ambiguous term.

What do you mean by customs?

Can you give an example?

Processes in Interpretation of Data

Summarizing: Calling for the idea buried in a long discourse.

Could you give us the main idea of what
you are saying?

Mapping Field: Obtaining as much information as possible.

Is there anything else that you would like to mention?

EXERCISES IN INTERPRETATION OF DATA: LITERATURE

Content:	Small groups of participants will analyze typescripts of contrasting classroom interaction, analyze alternate question sequences, develop and refine their own question sequence, and plan for a laboratory experience.
Leadership Materials:	Exercises in Interpretation of Data, Leadership Notes Analysis of Question Sequences (Annotated)
Participant Materials:	Typescript 1 Typescript 2 Analysis of Question Sequences Scrambled Question Sequence
Rationale:	To develop understanding and skill in the process of interpreting story content for feelings
Objective:	After (1) analyzing typescripts of classroom interaction which present alternate techniques for discussing the story, (2) relating these techniques to previously presented "teaching strategies," and (3) analyzing alternate strategies for discussing the story, participants will be able to conduct successfully a discussion lesson using this story with children. Data obtained by a trained observer will constitute evidence of success.

Sequence	Time	Group	Activity
A	5	SG	Analysis of Typescripts 1. Refer to Typescript 1; indicate that it is a typescript of interaction that took place in a fifth-grade class where the purpose of the discussion was to interpret *The Golden Crane* for its meaning. 2. Refer to Typescript 2; indicate that it is also a fifth-grade class with discussion conducted for the same purpose. 3. Ask participants to read through both typescripts.
B	20	SG	Interpreting the Typescripts 1. Conduct the following question sequence. a. "Assuming that these two classes have the same ability level, how do you account for the differences between the two discussions?" *Usually the response will be that the difference is accounted for by the opening question. If so, there will be no need to ask question b. However, depending on the discussion, ask question b or c.*

Sequence Time Group Activity

b. "What difference do you see between the opening questions?"

The opening question in Typescript 1 calls for generalizations and is very difficult for most children. It is asking the last question first.

The opening question in Typescript 2 calls for specifics and is one to which most children could respond immediately and successfully.

c. "How did the first question in our sensitivity experience with *The Golden Crane* differ from either Typescript 1 or Typescript 2?"

Sensitivity experience started with an open question.

Typescript 1 started with a inclusive-interpretation question.

Typescript 2 started with a focusing question.

d. "What value is there in starting the discussion with an open question?"

It provides an opportunity for more students to become involved, but does not change the final result.

Sequence	Time	Group	Activity

e. "How did the two teachers follow up the opening?"

Teacher 1 continued to pursue the big difficult question, with the result that the discussion stayed at a very low and superficial level.

Teacher 2 pursued the opening question for a few minutes, then asked a question which called for contrasting specifics:

Page 1, "What happened in the story that told you how the other people felt about the bird?"

She pursued this question for a few minutes, then asked that the specifics be interpreted for cause and effect relationships.

Page 2, "Why do you suppose that these feelings were different among the villagers and those of Oji-san and Toshi?"

She pursued this question for several minutes, then called for summarizing generalizations.

Page 3, "Do you suppose this story has a meaning to it?"

Exercises in Interpretation of Data

Sequence	Time	Group	Activity
C	20	SG	Analysis of Question Sequences 1. Refer to Analysis of Question Sequences. 2. Divide small group into pairs or triads and ask them to follow directions as indicated on the handout. 3. Reconvene small group and share reactions. Use the annotated Analysis of Question Sequences as your discussion guide.
D	20	SG	Scrambled Question Sequence: Literature 1. Refer to Scrambled Question Sequence. 2. Divide small group into pairs or triads and ask them to follow directions as indicated on the handout. 3. Reconvene small group and share reactions. *The important point of this activity is not that they all have the same sequences--or even sequences that are logical from your point of view--but that they do have a rationale for their sequence and can verbalize it.*

ANALYSIS OF QUESTION SEQUENCES
(Annotated)

Directions: You are teaching a unit on Japan. You wish to use *The Golden Crane* to help children identify personally with the feelings of the people. Read the question sequences below and decide which ones will draw out the best interpretation of feelings. Utilize A Structure of Process, page 90, and Questioning, pages 190-191, as your guide.

Sequence 1	What kind of story is this? What does the story tell us about these people? How did Toshi feel? Why did they fly into the sun?	Lacks open-memory question and interpretation question
Sequence 2	Whom did you meet in the story? What happened to them? Why did this happen? How did the child feel toward the old man? Why? What makes you think so? How did the old man feel toward the child? What makes you think so?	Lacks inclusive-interpretation question
Sequence 3	What happened? What does the story tell you about the lives of these people? How could we summarize our discussion?	Deals with facts, not feelings
Sequence 4	What happened in the story? What was there about Toshi that made him different from the other villagers? How was the bird like Toshi? Why do you think the story ended as it did?	Fits criteria
Sequence 5	Why was Toshi happy at the end of the story? What were your feelings about Toshi? What made Toshi and Oji-san friends? How did Toshi show these feelings?	Lacks effective sequence

TYPESCRIPT 1

The Golden Crane

Teacher: What was the meaning of the story "The Golden Crane" to you, Rachel?

Rachel: Well, I can't seem to think.

Teacher: Fred?

Fred: Well, it had a lot of golden cranes.

Teacher: Golden cranes. What meaning did it have for some of the rest of you? Marian?

Marian: The expression of the words it used.

Teacher: Anything else that the story meant to you? Susan, you've had some ideas just a little while ago. What did you think that story meant?
(No answer)

Teacher: Sven?

Sven: Well, just about the cranes. No, not just about the cranes but about a Chinese boy and the golden cranes.

Bryan: Japanese.

Sven: The Japanese boy and the golden cranes.

Teacher: Bryan thought it was a Japanese boy. Rachel, did you remember now?

Rachel: Yes. That you shouldn't take things that aren't yours.

Teacher: Why do you say that Rachel? Would you like to explain to us why you thought it meant that?

Rachel: Well, all the other men, they wanted the crane but it wasn't theirs.

Teacher: Susan?

Susan: Well, at the end, what the story meant to me was Toshi and the old man, well, they helped the cranes so the cranes helped them by taking them away.

Teacher: Fred, you had some ideas.

Fred: Well, see, like the fisherman, well he just helped the bird to get well, and the Emperor wanted the bird and the fisherman said that he was going to get it, that's all.

Typescript 1

Teacher: Fred?

Fred: When the golden birds came, they took the man and the boy, and then the boy could talk.

Edwin: And he could hear, too.

Teacher: Edwin, what was that?

Edwin: He could hear, too.

Teacher: Sue Anne?

Sue Anne: Well, in almost every story, there's a theory and in this story, there's a theory too. Not to order things that's not yours.

Teacher: So you felt the story had a lesson to teach us. Any other ideas about the meaning of the story? Rachel?

Rachel: Well, just that you should try to help other people and other things.

Teacher: Brad?

Brad: You shouldn't order people to give you things that aren't yours.

Teacher: Any other ideas? Sherrill, did you have any ideas? Did you enjoy the story?

Students: Yessss.

Teacher: Why did you like the story?

Student: Because it was good.

TYPESCRIPT 2

The Golden Crane

Teacher: What happened that told you how Toshi felt about the golden bird, Jim?

Jim: Well, you could tell how he felt, that he liked the golden bird because he didn't want anyone to take him because they belonged to, he belonged to--he should be free, and he didn't belong in a cage, and stuff like this.

Teacher: Any other ideas, Nancy?

Nancy: In the story he adored them.

Teacher: Anything else in the story that told you how Toshi felt about the golden bird, Robbie?

Robbie: Well, this may be what Nancy said, that right at the end, he stood up and he put his arms up and he said to the birds that he adored them.

Teacher: Cliff?

Cliff: He didn't want the crane to be caged up.

Teacher: Don, what were you going to say?

Don: The same thing.

Teacher: What happened in the story that told you how the other people felt about the bird, Gregg?

Gregg: Well, the golden crane was a holy bird so that they wanted to see it because they had never seen one close up.

Teacher: Sally?

Sally: They wanted to buy it because they thought it was so golden.

Teacher: Blake?

Blake: Well, they wanted to buy it because they thought it was so valuable, because the feathers were pure gold, and well they wanted to steal feathers and everything, and they wanted to get closer so they could do that and stuff.

Teacher: Jackie?

Jackie: Well, they called Toshi and what's his name, a fool because they didn't want to sell the bird.

Teacher: Did you have something, Jim? You had your hand raised.

Typescript 2

Jim: He said it.

Teacher: Don?

Don: Well, they thought the bird was from heaven, well, they kinda, you know, they thought it was a big thing.

Teacher: Nancy, you had something to contribute.

Nancy: Well, they thought it was, oh, a holy bird sent from heaven and that it was a miracle that one was there.

Teacher: Why do you suppose that these feelings were different among the villagers and those of Oji-san and Toshi? Why didn't they feel the same way towards the bird? Don, an idea?

Don: Well, they thought the bird would be good because of its riches and they thought it would be like a prince or something to have the only golden bird that there was. Well, not the only one, but the only one that was found.

Teacher: Peggy?

Peggy: Well, like she said, they thought that it would be real great. Everyone would think they were real great and come flocking to their house, so they'd get to charge rent and all the people would come to their house just to see this bird and they thought it was a big thing to have it caged because no bird like that had ever been caged.

Teacher: Why do you suppose that they felt differently than Toshi and Oji-san did?

Boy: Well, for one thing they didn't have it at their place and they were a little bit jealous probably.

Teacher: So you think jealously may have been one of the reasons why they felt differently than Oji-san and Toshi did. Give us some other ideas. Sally, you have one?

Sally: Well, Toshi, they knew the bird didn't belong to them. That's why they wouldn't sell it. The village people thought they just wanted all the money.

Teacher: Wendy?

Wendy: Well, Toshi and Oji-san, they were a lot closer to the bird because, well, they took him home and they mended his wing, so the bird was like, with them, so they'd be closer to the bird than the villagers.

Typescript 2

Girl: The people were thinking about the money that they could get off of it. But they were thinking of the bird so they could fly back with it.

Teacher: Now let's back-track a little with you. You used 'they' both times and I'm not sure. Did you mean....

Girl: The people were thinking of the riches and Toshi and Oji-san were thinking about the bird so that he could be back with his relatives.

Teacher: Jim?

Jim: Well, all the people around were sort of selfish because they thought that everyone would be going around paying them money and they thought they'd get lots of money for the golden bird, and you'd give a present to the Emperor and he'd do something real nice. He'd give you a nice position. They were just kind of selfish.

Teacher: Nancy?

Nancy: Lots of people didn't realize that it was a free bird and shouldn't be caged up. The old fisherman and the little boy did.

Teacher: Don?

Don: Well, to Oji-san and Toshi, the bird was like a pet to them at first. Well, they didn't want to give it away and they wanted the bird to go back to his brothers and sisters.

Teacher: Robbie, what were you going to say?

Robbie: Well, Oji-san and Toshi didn't want that. I was just thinking that any free animal shouldn't be caged. Like them golden cranes. None of them should be caged.

Teacher: And are you saying that Toshi and Oji-san felt as you do?

Robin: Yah. And that they might feel...kind of awkward if they just let the bird go and be caged up. How would you like to be caged up just like an animal?

Teacher: Hinkie?

Hinkie: Well, it gives me the kind of feeling that people seem to think they are rather superior 'cause, well, it's all right if they kill an animal and then send it to market and have somebody buy it and cook it and eat it; cannibals are dreadful and, well, they think it's perfectly right to catch an animal and cage him.

Typescript 2

Teacher: Do you think this story has a meaning to it? Was it just a good story or was there some meaning to that story? Leslie?

Leslie: Well, it means that the wild animals should be free and then they can live better. They shouldn't be caged.

Teacher: Blake?

Blake: It really does a good job of showing man's greed because when they all wanted that bird, the rich man, the, the Lord Governor and Emperor and all of them; well, they were all greedy and they were willing to pay so much for this bird and it just does a wonderful job of showing that.

Teacher: Jim?

Jim: Well, every story has a meaning, but I think that it shows how greedy we can be sometimes and how the lot nicer people really come out good in the end because they got to go up with the cranes, and the Emperor didn't get mad at them or chop off their heads or anything because they went with the cranes and they were never seen again.

Teacher: Gregg, I think you had your hand up.

Gregg: Well, I think that it has a meaning because if somebody is deaf and dumb and at the end it said that he said, "Beautiful birds, I adore you," or something, because that would be a miracle.

Boy: Well, they must have been from the heavens or how could he have said that?

Teacher: So Robbie, what are you really saying about the meaning of the story?

Robbie: I'm saying, ah, well, like they said at the beginning of the story, these birds must be holy birds.

Teacher: Nancy?

Nancy: Well, I think it does a good job of showing how many people don't realize about quite a few things.

Teacher: Now can you be more specific? What do they realize about, Nancy?

Nancy: Oh, things like animals. They don't realize that they live too. They have families just like we do.

Teacher: Anything else you had in mind?
(No answer)

Typescript 2

Teacher: Don?

Don: They don't realize the freedom of the birds and how, well, like if they were a bird or if they were wounded, they wouldn't like to be caged up and away from their heavens and stuff. They'd rather have their own freedom.

Teacher: Jack?

Jack: Well, birds should be free like us. Well, we're caging other birds up, but what if it were the other way around and birds came swooping down and grabs up someone and dumps them in a cage.

Teacher: Do you think this is some of the meaning the author was trying to show in this story?

Jack: Well, that we should let other animals be free.

Teacher: Do you have another thought, Nancy?

Nancy: Yah. Now I know what I was going to say. They don't care about other living things except themselves.

ANALYSIS OF QUESTION SEQUENCES

Directions: You are teaching a unit on Japan. You wish to use *The Golden Crane* to help children identify personally with the feelings of people. Read the question sequences below and decide which ones will draw out the best interpretation of feelings. Utilize A Structure of Process, page 90, and Questioning, pages 190-191, as your guide.

Sequence 1
What kind of story is this?
What does the story tell us about these people?
How did Toshi feel?
Why did they fly into the sun?

Sequence 2
Whom did you meet in the story?
What happened to them?
Why did this happen?
How did the child feel towards the old man?
Why? What makes you think so?
How did the old man feel toward the child?
What makes you think so?

Sequence 3
What happened?
What does the story tell you about the lives of these people?
How could we summarize our discussion?

Sequence 4
What happened in the story?
What was there about Toshi that made him different from the other villagers?
How was the bird like Toshi?
Why do you think the story ended as it did?

Sequence 5
Why was Toshi happy at the end of the story?
What were your feelings about Toshi?
What made Toshi and Oji-san friends?
How did Toshi show these feelings?

SCRAMBLED QUESTION SEQUENCE

You have read a story to the class about Betty, a sixth grader, who is so bossy that finally the rest of the class leaves her out of all the activities. Rearrange the following questions into a logical sequence appropriate for a sensitizing experience.

1. Has anything like this ever happened to you?
2. How did you feel when this happened to you?
3. What happened in the story?
4. Why do you think the class left Betty out of all the activities?
5. How do you think Betty felt about being left out?
6. What in the story showed that Betty knew the class was getting even?
7. How might the situation with Betty have been different?

INTERPRETATION OF DATA LABORATORY EXPERIENCE

Content: Following the reading of *The Golden Crane*, participants are assigned to a classroom to conduct a question sequence designed to interpret feelings.

Leadership Materials: Interpretation of Data, Leadership Notes

Participant Materials: *The Golden Crane*, pages 306-315.

The Generalizing Process

Rationale: To provide an intellectual and emotional experience which will increase sensitivity to the operation and results of the interpretation of data process

Objective: Following teaching in a classroom, in which a question sequence has been utilized to interpret expression of feeling in a piece of literature, participants will demonstrate interest in and understanding of the interpretation of data process by actively participating in subsequent activities.

The laboratory experience for interpreting literature is designed primarily as another sensitizing experience. Participants are asked to design a question sequence to use with *The Golden Crane*, which has as its purpose the interpretation of feelings. They are asked to work with a group of children to try out this process, but they will not be observed. Some degree of anxiety will be evident. However, all participants can expect to have success with this experience and it is conducted in a relatively threat-free manner.

Sequence	Time	Group	Activity
A			Prelaboratory Experience Planning

I. Workshop Format

In advance of this laboratory experience, confer with the local school administrator in charge and arrange for the appropriate number and grade level of classrooms. Since all participants will be teaching at the same time, arrangements need to include:

a. A group of children for each participant. This need not be an entire class if physical arrangements can be made to divide a class.

b. A specific time of from 40 to 60 minutes in length, when all participants may be teaching.

Sequence Time Group Activity

c. An appropriate grade level for each participant. This will have been determined in advance when arranging for the concept diagnosis laboratory experience teams.

II. Extension Course Format

Each participant will return to his own classroom to implement this experience. Administrators, supervisors and others who will not have their own classrooms should be asked to locate a classroom for this experience. Be very specific--ALL PARTICIPANTS ARE EXPECTED TO CONDUCT THE EXERCISE.

III. Methods Course Format

In advance of the laboratory experience, follow the above directions for the workshop format. Since this activity results in very little interference with the regular ongoing program in a school, most school administrators will be happy to comply with your request.

B 10 SG Assignment of Laboratory Experience

1. Indicate the following:

   a. Each participant is to develop a question sequence for use with

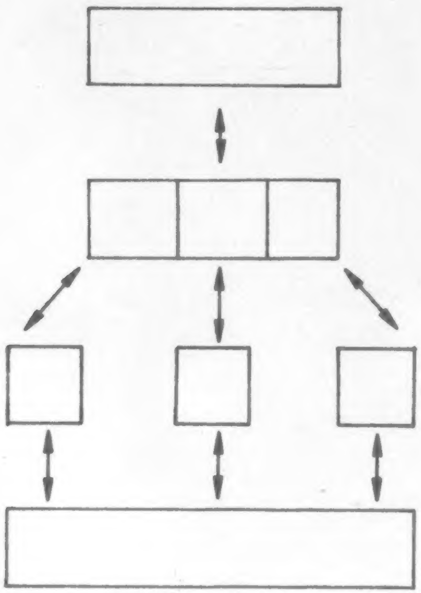
Interpretation of Data

Sequence	Time	Group	Activity
			The Golden Crane (or other appropriate story), designed to interpret for feelings. That is, to interpret the data of the story in such a way as to identify, relate and generalize about the respective feelings of the characters in the story. b. At a particular hour (indicate when) participants should meet with a designated group of students, read the story and conduct the question sequence. [If primary teachers use *The Golden Crane*, they may wish to shorten the story by editing it in advance or by "telling" the story. Also, they may need to develop certain concepts in advance; "golden crane" may mean "golden machine" to some primary children.] c. Each participant will be by himself. d. The purpose of the activity is to provide greater sensitivity to the interpretation of data process. 2. Announce specific assignments if appropriate: Time School Classroom
C	30-60	SG	Plan Laboratory Experience 1. Provide time for individuals or small groups to develop their question sequence.

Interpretation of Data

Sequence	Time	Group	Activity
			2. If anyone indicates that he is uncomfortable reading a story of this length, suggest that he tape record it, even putting in sound effects.
D	60	Schools	Laboratory Experience 1. Participants conduct the activities.
E	20	SG	Reaction to Laboratory Experience 1. The purpose of reacting to the laboratory experience is basically one of allowing the participants to "share" what happened. Ask participants to indicate specifically what question sequences were used, and their perceptions of the results. If by chance someone did "bomb out" (which is very rare), involve the group in an analysis of the situation, being careful to keep the discussion objective rather than judgmental.
F	10	SG	Model of Generalizing Process Following the laboratory experience, refer to The Generalizing Process. Indicate that this is an example of another way of viewing the generalizing process. Allow time to read and respond to questions or comments.

THE GENERALIZING PROCESS



GENERALIZATIONS	INCLUSIVE-INTERPRETATION QUESTION	Seeks high level abstraction in the form of summary of ideas expressed in the discussion (Generalizations)
CONCEPTS	INTERPRETATION QUESTION	Seeks statements of relationship among concepts leading to generalizations
DATA	FOCUSING-MEMORY QUESTION	Seeks specific data to be compared and contrasted
DATA	OPEN-MEMORY QUESTION	Seeks open, active, "free" verbal participation

Enabling Moves

- Accepting
- Supporting
- Clarifying

Maintains an open, supportive discussion climate

Facilitating Moves

- Lifting (Moves to next higher level)
- Extending (Asks for more information)
- Substantiating (Asks for basis of idea)

INTERPRETATION OF DATA: FILMS

Content:	Following a large group viewing of a film, there are small group exercises in constructing and refining question sequences.
Leadership Materials:	Interpretation of Data: Films, Leadership Notes Film projector and film
Participant Materials:	Interpretation of Data Observation Guide
Rationale:	To sensitize participants to the fact that a film is also an information display To develop skill in designing and implementing discussion strategies which cause children to interpret films for both facts and feelings
Objective:	Following the viewing of a film which deals with the feelings and values of people, as well as depicting their culture--and subsequently developing and refining question strategies which are designed to lead children to interpret film content for both facts and feelings--participants will be able to conduct such question strategies successfully with children as evidenced by data obtained by a trained observer.

SENSITIVITY TO INTERPRETATION OF DATA: FILMS OPTIONAL EXERCISE

Depending upon the unique situation of each instructional program you may find it is occasionally appropriate and meaningful to use a film as a sensitizing experience for interpretation of data. If so, construct an appropriate question sequence and follow the discussion with the analysis strategy given in Sensitivity to Interpretation of Data: Literature. From there, return to the next page and the indicated exercises for films.

A question sequence which has been used with success for the film, "Japanese Boy, The Story of Taro," is as follows:

What were the feelings expressed by Taro in this film?

What do you suppose were the reasons for his strong love for Moriocki?

What did the watch mean to Taro?

Why do you suppose it meant so much to him?

Do you suppose there is something that one might learn from this film?

A main purpose of this activity is to sensitize participants to the fact that a film is also an information display that can be interpreted for both factual content and feelings.

Two particularly good films for use with this activity are:

"Japanese Boy, The Story of Taro"

"Mexican Boy, The Story of Pablo"

Both films present a story which depicts the people as "real," having genuine human emotions, problems and joys. Both can be used very effectively to help children identify personally with people in a different culture.

If neither of these films is available, it is suggested that you preview films which deal with feelings and contrasting cultures.

Sequence	Time	Group	Activity
A	30	LG	Viewing Film 1. In advance of viewing film, simply point out that a film can be considered an information display that may be used in a variety of ways. Indicate the participants need not take notes; they should just relax and enjoy the film. 2. View film.

Interpretation of Data: Films

Sequence	Time	Group	Activity
B	15	SG	Interpreting the Film 1. Conduct the following discussion sequence. a. "How could you use this film?" *Opening to unit* *Facts for information display* *Confirming researched information* *Generalizing experience* *Sensitivity to values and feelings* b. If no one suggests that it can be used for exploring human relations, ask, "Could it be used to sensitize students to the values and feelings of people?" "In what way?"
C	45	SG	Constructing Question Sequences 1. Divide participants into subgroups of 3 or 4 members. 2. Ask that they construct two question sequences. a. One which leads students to identify personally with the people b. One which leads students to generalize from the factual content of the film

Interpretation of Data: Films

Sequence	Time	Group	Activity
			3. Indicate that they should be prepared to write their sequences on the board (or on butcher paper with flow pens) and explain their purpose and procedures.
D	30	SG	Sharing and Refining Sequences 1. Start with human relations sequences. Have groups write sequences on board (or display charts). Display them side by side if possible. 2. Ask each group to give rationale and procedure for their sequence. 3. Ask for reactions from the total group. 4. Allow groups to refine sequences. *Remember: the object here is not to have them develop what you consider to be the most logical sequence. The point of the activity is to cause them to "involve" themselves with each other in identifying, designing and testing their rationale and procedure for questioning.* 5. Repeat the above four steps with the generalizing question sequence.
E		SG	Plan Laboratory Experience If a workshop or methods course format is being followed, a laboratory experience with films is usually not feasible. Thirty to sixty participants,

Sequence	Time	Group	Activity

all showing films at the same time, is obviously impossible. However, if the participants are able to return to their own classrooms for a laboratory experience, it is recommended that the activity be implemented.

1. Assign each participant to:
   a. Locate an appropriate film for his grade level and/or discipline
   b. Design a question sequence appropriate for a sensitizing experience
   c. Conduct the strategy under observation, if possible (Ask participants to use Interpretation of Data Observation Guide)
   d. Critique the teacher behavior and student response

INTERPRETATION OF DATA
OBSERVATION GUIDE

Teacher ____________________

Observer ____________________

Grade and Subject ____________

I. Open-Memory Question ____

____

Check	Tally
	Student Response
_____Directed toward one dimension of the data	_____Read specific points from the data
_____Directed toward several dimensions	_____Compared or contrasted
	_____Generalized

None (Pupil Participation) 100 Percent

II. Focusing-Memory Question(s) ________________________________

____

____

Check	Tally
	Student Response
_____Directed toward a response elicited from an open question	_____Read specific points from the data
_____Directed toward teacher initiated focus	_____Compared or contrasted
	_____Generalized
	Teacher Behavior
	_____Called for refocus
	_____Asked for substantiation

None (Pupil Participation) 100 Percent

Interpretation of Data
Observation Guide

III. Interpretation Question(s) ______________________________

____

____

Tally

Teacher Behavior

_______Asked for clarification

_______Asked for substantiation

_______Helped students recall information not on display

_______Supported a student

_______Supplied information

_______Provided personal opinion

_______Refocused discussion

Student Behavior

_______Sought clarification from classmates

_______Sought clarification from teacher

_______Challenged validity of a statement

_______Supplied substantiating information

_______Utilized data from sources not displayed

____

None (Pupil Participation) 100 Percent

IV. Inclusive-Interpretation Question ______________________________

____

Tally

Teacher Behavior

_______Elicited more than one generalization

_______Led students to combine several generalizations into one

_______Asked for substantiation

Student Response

_______Read specific points from the data

_______Related two or more specific points

_______Generalized without supporting evidence

_______Generalized with supporting evidence

_______Modified or added to another generalization

Interpretation of Data Observation Guide

Following observation, indicate--

__________ Data sufficient for observation

__________ Data visible to all students

__________ Data legible

__________ Data easily understood

__________ Students aware of the process involved and the purpose

__________ Predominately teacher-pupil interaction

__________ Predominately pupil-pupil interaction

__________ Pupils operated autonomously

Cite evidence of autonomous thinking:

____

____

____

What did you learn from this observation about the thought processes of the students involved?

PROCESSES WITH LEARNING EXPERIENCES

Content: A handout is provided to participants which gives the theory, purpose and techniques for providing firsthand, simulated and indirect learning experiences

Leadership Materials: Processes With Learning Experience, Leadership Notes

Participant Materials: Learning Experiences

Rationale: To provide a knowledge base for practical application of various types of learning experiences

Objective: Following the reading and a brief discussion of the handout Learning Experiences, participants will have a broader understanding of the types of learning experiences available and the value of each, as evidenced by their ability to cope with a subsequent exercise on selecting and programing learning experiences.

Sequence	Time	Group	Activity
A	15	LG	Introduce and read Learning Experiences

1. Refer to Learning Experiences. Indicate this list illustrates some of the kinds of learning experiences by which data may be gathered. Since this is knowledge base material, participants should keep it accessible for reference in subsequent activities.
2. Allow approximately ten minutes for reading.
3. A brief discussion should bring out the following points:
    a. There are many other learning experiences, besides those we have been concentrating on, which may be utilized effectively in a classroom.
    b. A teacher's knowledge of, or willingness to learn about, the community resources available is essential if more than indirect experiences are to be provided.
    c. The learning experiences listed are most efficiently used as sources of data, rather than as introductions or culminations.
    d. Each learning experience can be made to serve more than one function.

LEARNING EXPERIENCES

Learning may be acquired in three ways: (a) firsthand experiences, (b) simulated experiences and (c) indirect experiences.

Despite the fact that we cannot successfully cope with reality on the indirect symbolic levels until we have had experience firsthand with which to build a foundation, it is often not feasible in terms of time, money, ability or efficiency to arrange firsthand encounters for each learning experience. Therefore, all three ways must be incorporated into a sound educational program in order for the learner to tie all experiences, concrete and abstract, together. An experience has meaning only when the learner is able to relate it to something already in his storehouse of knowledge. Thus, it is axiomatic that the learner will obtain from each learning experience in proportion to what he is able to bring to it. Teachers must plan to exploit each activity for every bit of learning available.

As a corollary to the above statement, whenever students themselves are able to carry out all or any part of the learning experience, from its inception to its conclusion, they should be allowed to do so. At first, the teacher may need to give close guidance, providing a secure structure within which students may operate. Increasingly, pupils should be provided greater autonomy in learning activities to the point where they assume most of the responsibility in areas such as: making arrangements for field trips, resource persons and interviews; suggesting worthwhile learning experiences; personal conduct; gathering and organizing data; sharing information; relating to previous experiences; and attending to the social amenities appropriate to the occasion.

Learning Experiences

I. FIRSTHAND EXPERIENCES

A. Field Trips

Field trips vary in character from those composed of several classrooms to those involving only two or three members of a class and from distances requiring overnight facilities to a walk to the far corner of the school yard. While field trips may be utilized at any time within a unit, they are most effective when used to gather data for a specific task.

Students need to be well prepared in advance. If they have designated study questions or topics to cover, adequate research should precede the field trip to provide a foundation of knowledge. Field experiences then may be related to this foundation. Students are also able to use the field trip as a source of data to fill in missing elements of information.

The purpose of the field trip must be clear to students, supervisors and guides. Pupils should have questions on topics written before leaving for the trip. Check to see that each student has: (a) his questions with space allowed for writing, (b) a writing surface, e.g., clipboard or stenographic notebook, (c) pencil or pen, (d) container if specimens or materials are to be collected. Usually it is desirable to designate small groups, each supervised by an adult, to maximize the opportunities for seeing, touching, hearing and questioning.

Guides for the facilities to be visited should be informed of students' background preparation, probable questions, comprehension levels and attention span.

Learning Experiences

Since field trips are learning experiences for the students, ideally the teacher in this situation is an unobtrusive presence. He has previously developed a classroom atmosphere which places responsibility for conduct and learning upon the students. In the field, then, he can comfortably allow pupils to ask the questions, stepping in only when it is apparent that a salient point may be omitted.

Following a field trip, students need to share their information, then organize it for future reference. Organization may be accomplished through charts, graphs, diagrams, illustrations, displays or written reports. As a matter of courtesy, and to extend learning, students should write letters of appreciation to their field host where appropriate, citing specifically what they gained from the experience. It is recommended that every student's letter be sent. Several reasons underlie this recommendation:

1. Each student feels he is a representative of the class and school. The effort pupils will put into writing a letter to make it legible, sincere and meaningful under these circumstances is most satisfying.
2. Students must mentally review the excursion to determine what they learned.
3. Guides gain feedback as to the effectiveness of their presentations.

Many times two or three students can more efficiently gather data than can an entire class. For example, a class is concerned with the problems of the lumber industry on the West Coast. The question has arisen as to the local effect of Japanese lumber imports and exports. The class decides to visit a logging firm to ascertain the amount and kind of logs exported to Japan, and to visit a local lumberyard to gather data on the amount and kind of finished lumber imported from Japan. The purpose here is not to familiarize pupils with the process of lumbering, and the data to be gathered does not necessitate observation by each individual member of the class in order to be understood. In this case it is most appropriate for a delegation of two or three students accompanied by an adult supervisor to visit a logging firm and a similar group to visit the lumberyard. Data can then be shared with the rest of the class.

Allow time for students to arrange the data in a display, chart or graph, rather than attempt to present it solely as an oral report.

B. Interviews

In many respects, interviews are closely akin to field trips. Interviews are less concerned with observations than are field trips and involve fewer students. With training, students become adept at carrying out all the details involved, from arranging for the interview to the followup letter of appreciation. The following procedure has proven to result in interviews mutually satisfying to both pupils and interviewee.

Large Group

1. Value of interviews as means for obtaining data are discussed.
2. A question calling for data which can best be obtained from informed individuals is presented to, or by, the

students; e.g., "What are the duties of our city judge?" "What wild edible plants can be found in our locale?"

Students analyze the problem for its component parts. In the first example, the problem may be broken into several aspects.

a. What are the duties of the city judge?

b. What qualifications are required?

c. Is the position appointive or elective?

d. Is it a full-time position?

e. Personal data about incumbent.

Training
Years in office
Attitude toward position

For the second example, the problem breakdown might be:

a. What wild edible plants can be found in our locale?

b. How can these be identified?

c. Where are they to be found?

d. How should they be prepared?

Students need to be sensitized to questioning strategies. Allow them to "try out" their questions on one another to learn what type of response a particular question is likely to elicit. They soon develop an awareness of the effect of certain words in promoting or impeding communication.

3. Standards are formulated by pupils and teacher for requesting interviews, both by telephone and letter. Explicitness in purpose, time and location are stressed. Pupils should be aware that individuals important enough

to be a source of needed information are busy people; therefore, interviewers must be well organized in order not to waste the interviewee's time.

Pupils need to practice asking for interviews by telephone and by letter. They should be confronted with problems involving secretaries or receptionists as well as contacting the interviewee personally.

Small Group

1. To lend moral support to one another and to facilitate data taking, it is well to "pair" students for interviewing. If more than one interview is to be conducted, several pairs may be formed.

   Together, members of the team decide upon the questions to be asked, if the class has not previously formulated them. As a means for recording questions, 4x6 cards work well. The member who will be primarily responsible for verbal interaction should write all the questions on one card. The other, the recorder, should use a separate card for each question and provide himself with several blank cards on which to record additional information.

   Both members plan their request for an interview to the extent of writing down exactly what they intend to say. If it is a letter, the teacher should proofread it before it is sent, having it rewritten if necessary. If it is to be a telephone request, the teacher listens as pupils enact it, making them clarify vague points. In the case of telephone requests, it is advisable for the teacher to be in the same room as the pupil who is telephoning in case the interviewee asks for a change of time or poses a question which the student had not anticipated.

2. An adult supervisor accompanies elementary school interviewers to the appointed location. This is one time when all parties concerned function more effectively if the school-connected adult is neither seen nor heard. If the interview is to be conducted in an office, the supervisor should remain in the waiting room. A walk around the block, or a look at the flowers in the yard, or a perusal of books in an adjacent room is in order.
3. Interviewers need a time for sharing as, usually, they've garnered more information than originally sought, and frequently have been invited to "visit a session of court" or referred to additional sources of data. The trip back to school often is an opportunity for pupils to share immediate perceptions and elation. Followup activities for an interview include organizing the data gathered and writing a thank you letter.

C. Resource People

Resource persons serve as an invaluable source of firsthand information, invariably more up to date on the topic than the most recent textbook. Secondly, the resource person is an authority on his subject and viewed as such by students. An M.D. explaining the skeletal system makes a much deeper impression on a class than does an M.S. or even a Ph.D. The Air Force major in dress uniform explaining aerodynamics immediately captures the attention of every student of any age, and rarely loses it. As with any other educational enterprise, resource personnel should be chosen with a view to the educational objectives established for each particular classroom.

Frequently, qualified resource people are experienced in talking with groups and have developed effective techniques for relating to their audience. If pupils are able to make arrangements for the resource person's visitation, they will provide him with an orientation as to the group's background, interests and purpose.

Don't hesitate to utilize as resource people those who are unaccustomed to appearing before groups. The newly-arrived immigrant in the neighborhood may be a gold mine of information on customs in his native land. A slight accent whets and holds interest. For the uninitiated resource person the following suggestions may be helpful:

1. Visual aids of any type--slides, photographs, pictures, relics--reinforce the verbal information.
2. Involve pupils in the presentation by directing questions or responsibilities to them. "What is this?" "Feel the ball and socket joint here." "Will you two hold this up so that everyone can see it?"
3. Allow time for questions and closer observation of exhibits at the end of the presentation. Allowing for questions during the presentation may disrupt the speaker's plan of presentation or cause the discussion to go off on a

tangent. Pupil handling of objects during the presentation proves to be a distraction to the speaker and to the other pupils.

4. The discussion should be terminated at a specific time or when pupils appear ready for closure as observed by either the speaker or teacher.

Advance preparation on the students' part for a resource person's visit entails the same procedure as for a field trip or interview. Pupils should be prepared to take notes, have questions ready previous to the visit, and organize and interpret data. Followup letters of appreciation increase pupils' communication skills, help them to set up evaluative criteria, and serve as a means of review.

II. SIMULATED EXPERIENCES

A. Models, Mockups and Specimens

Obviously, arrangements cannot be made for all data to be gathered from the field by students. In some circumstances, it is advantageous to remove the complicating and distracting elements of firsthand experience so that students can more easily come to grips with the heart of the problem. If the objective is to teach the properties of certain minerals, it is more expedient to provide pupils with samples with which to experiment and observe than to insist that they spend days scouring the countryside in a vain attempt to locate a specimen. Similarly, models, including globes, simulated terrains and mockups may be utilized to focus learning activities upon a specific area, point or component, eliminating the clutter of the original.

B. Role Playing

Role playing is a simulated experience designed to sensitize participants to attitudes and values.

The problem/setting involved in role playing is sufficiently removed from the students to enable them to participate without threat of laying bare their personal problems and reactions.

Using role playing, with subsequent discussion, to identify with characters in a novel allows the class to view the acts of a character as a reflection of the values held by that character. Alternative actions and the consequences may be discussed, enacted if desired. When participants have gained sufficient insight into the cause-and-effect relationship of values and decisions, the teacher may lead pupils toward generalizing from their role-playing sessions.

III. INDIRECT EXPERIENCES

Obviously, the most common indirect learning experience is reading from books or other materials in a "literature" format. Since this is not the place to take up the manifold problems of reading skill and instruction, we shall omit reading in this context and concern ourselves with other kinds of indirect learning experiences.

A. Pictures

Most textbooks are replete with pictures, travel bureaus are willing to provide pictures of high quality, health agencies are anxious to promote desirable habits of hygiene through illustrations, yet the skill of picture reading is rarely taught other than in primary grades. Consequently, students have not been able to capitalize on the wealth of data that is so readily available to them. Because pictures often are the most accurate and least misleading source of data at hand, we have done students a great injustice by ignoring picture reading as an avenue of learning. For the poor reader or nonreader, picture interpretation is an indispensable tool.

Interpretation of pictures is analogous to interpretation of reading matter.

Step One is initiated by pupils being asked an open question, which leads them to identify the items, animate and inanimate, within the picture. "What do you see in this picture?"

Step Two: A focusing question to identify the functions of items. "What is the use (meaning) of the stick?"

Step Three: An interpretive question seeking the interrelating aspects within the picture. "What is the meaning (significance) of the flies on the baby's face?"

Step Four: An inclusive-interpretation question calling for generalizing from the contents of the picture. "From the information available in this picture, what can you say about the health conditions of the people depicted?"

Cartoons lend themselves to the same teaching strategy.

The ultimate goal is for the pupil to be able to look at a picture of any type--photograph, cartoon, illustration, mural, diorama--and analyze it in the same sequential pattern for himself, then incorporate his findings into his collection of data.

Pictures should be organized and indexed just as are newspaper clippings and periodical articles, and should be readily accessible to pupils.

B. Maps

The prevalence of maps in all subject matter areas demands that pupils be skillful in their interpretation. Not all pupils can handle all aspects of a map at one time. A group without experience in map interpretation may require an intensive study of many aspects of map reading. Whether pupils are to be taught through an intensive course on map interpretation or as the need arises, a step-by-step approach is needed. Most students need to look at one area, one dimension, before proceeding to the entire map and its multiple relationships. Build security in handling the geographic aspects of one nation before proceeding to a continent. When land form has been mastered, then political divisions may be related. As the students' skill increases, relate several different maps--population with rainfall, per capita income with population and rainfall.

The best test of the mastery of many skills is the ability to use them conversely. Design experiences wherein students translate text material into a map or series of maps.

Learning Experiences

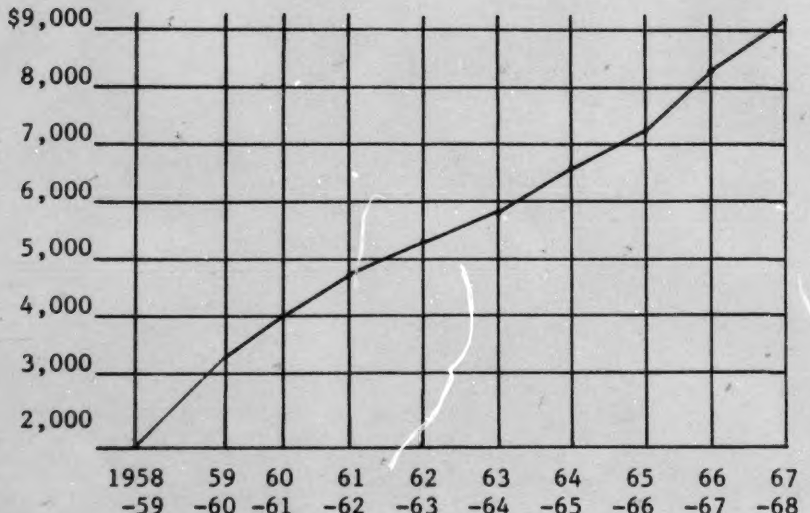
C. Graph Interpretation

Graphs, like maps, diagrams, charts and pictures, eliminate much useless verbalization to make a point quickly and clearly. The ability to use them as a source for data and as a means of expressing data enhances the academic powers of every student, particularly those handicapped in reading.

Use of graphs requires understandings which go beyond mere recognition of bar, amount of circle colored, or pitch of line. Rarely is it sufficient to interpret a graph without relating it to other data. For instance, a graph may show that the percentage of farmers in Guatemala is 60 percent; the percentage in Mexico is also 60 percent. But are students aware that 60 percent of the Mexican population is not the same number of people as 60 percent of the Guatemalan population?

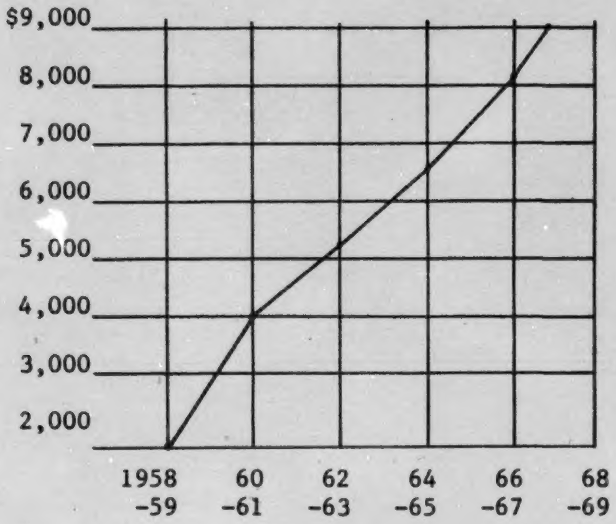
The pitch of line graphs may be most deceptive, as the following illustration demonstrates:

Teachers' Salaries Over a Ten-Year Period



Learning Experiences

Teachers' Salaries Over a Ten-Year Period



Pupils should be alert to the possibilities for misinterpretation due to various methods of representation.

D. Diagram Interpretation

Diagrams represent only the essential elements of a structure. Usually diagrams are keyed or labeled to facilitate interpretation. The interpreter must do two things in order to comprehend a diagram, (a) mentally relate the diagram to the original structure, (b) interpret the labels or key. Basically, the ability to handle symbols is involved. When the diagram is symbolic of a structure existing within the students' environment, the relating is automatic. Difficulty is encountered when the student has no association with the structure, e.g., the diagram of a volcanic cone to a child reared within the borders of Iowa. Pictures may be needed to develop or clarify the concept. It may be necessary to measure off the actual dimensions on the school ground in order for students to conceive the proper size.

As with maps, in teaching the interpretation of diagrams, move part-by-part in interpreting rather than attempting to encompass the entire diagram in one observation.

When pupils themselves begin to utilize diagrams to explain ideas, the teacher may be sure that they not only are able to interpret diagrams, but also have a thorough understanding of the idea.

E. Chart Interpretation

Charts are a succinct means of expressing data which may have been contained in numerous pages of expository material. Information may be summarized, listed or diagramed. To develop chart interpretation skills, the same questioning strategy is used as in picture interpretation with the insertion of:

"What likenesses exist?"

"How do you account for these similarities?"

If the information lends itself to an analysis of similarities and differences, the same questions concerning differences between the focusing and interpretation questions should be used.

Charts are one of the most common methods used in the classroom for pulling together a welter of data. Certain guidelines need to be followed if chart-making is to be a learning experience and to insure charts capable of being interpreted.

Learning Experiences

1. Decide as a class as to the type of chart which will best display the information accumulated.
2. Develop standards regarding:
    a. Uniform size
    b. Parallel information if two or more situations are to be compared
    c. Script or manuscript--size of letters
    d. Sentences, phrases, listings
    e. Proofreading
    f. Medium for writing
    g. Illustrations, if any
    h. Outline or narrative form
3. Each pupil should be delegated a specific responsibility. Even the most incompetent pupil can "block-in" letters. The object is to provide each student with the opportunity to be a functioning part of the group.
4. The teacher's responsibilities are manifold. Adhere to high standards. Charts containing illegible writing, incomprehensible spelling or sentence structure, insufficient or inaccurate data, are a waste of time since they fail to serve their primary function as a display of data to be interpreted. Challenge pupils on accuracy of information; demand further research to supply missing data.

The process of interpreting charts is the same as the interpretation of any other data, always be sure to proceed step by step.

EXERCISES IN SELECTING AND PROGRAMING LEARNING EXPERIENCES

Content:	Simulation exercises are provided to develop skills in the processes of selecting and programing a series of learning experiences.
Leadership Materials:	Exercises in Selecting and Programing Learning Experiences, Leadership Notes
Participant Materials:	Exercise in Selecting Learning Experiences Exercise in Programing Learning Experiences Learning Experiences Exercise in Organizing an Information Display Research Notes on Japan and India
Rationale:	To develop understanding of, and skill in, the processes of selecting and programing a series of learning experiences
Objective:	Following a set of exercises which require participants to select and program a series of learning experiences, they will demonstrate their understanding of and skill in the processes by effectively selecting and programing a series of learning experiences for their instructional units.

EXERCISES IN SELECTING AND PROGRAMING LEARNING EXPERIENCES

Leadership Notes

Sequence	Time	Group	Activity
A	40	SG	Selecting Learning Experiences 1. Refer to Exercise in Selecting Learning Experiences. 2. Read directions and illustrate what they are to do by evaluating the first learning experience with the total group. (If further information is necessary, refer to Rationale for Curriculum Development.) 3. Divide into subgroups of two or three members. Allow 20 minutes for these groups to evaluate each learning activity using the criteria for selection of learning experiences listed. 4. Reconvene and ask participants to share their selections, providing the rationale they used for each selection.
B	40	SG	Programing Learning Experiences 1. Refer to Exercise in Programing Learning Experiences. 2. Utilizing the learning experiences which participants selected, ask the same subgroups of two or three to

arrange them in proper sequence according to the indicated criteria. Allow approximately 20 minutes.

3. Share decisions, with participants presenting their basis for the organizational pattern they selected.

Suggested possible organization of learning experiences:

1 10
3 6
2 9
7 4

C 60 SG **Organizing an Information Display**

1. Ask participants to refer to dimensions of Japan-India unit studied in the first two exercises.

	Relations With Others	Religion	Customs	Agriculture	Industry	Government
Japan						
India						

Indicate this is an exercise to develop sensitivity to the process of building an information display.

Indicate that ordinarily students would spend many hours or days in the process of acquiring data and presenting it in a form to be interpreted. However,

Sequence	Time	Group	Activity

they are being asked to accomplish this process in the next hour.

2. Refer to Exercise in Organizing an Information Display.
3. Divide participants into six groups. (Interest may be used as a basis. One group for each dimension of the information display.)
4. Hand out two sheets of large newsprint paper and flow pens (or comparable materials) to each group.
5. Indicate the groups are to meet and organize so a chart is developed for each country in relation to the dimension to which they have been assigned. They are to:
    a. Scan the information and chart data
    b. Chart quantitative data to the extent possible
    c. Chart data in parallel form so the two charts can be compared
    d. Sources of data are:
        1. Research Notes on Japan and India
        2. Recalled information from *The Golden Crane*

Sequence	Time	Group	Activity
			3. Recalled information from a film on Japan or India, if one was used in the activity Interpretation of Data, Films. e. Set up chart standards with groups such as: 1. Confined to specified size 2. Legible 3. Large enough to be seen from any place in room 4. Relevant to topic f. Point out to groups that not every specific fact needs to be charted. One of the problems with which students must deal is discrimination and selection of relevant facts. 6. Collect information displays at end of allotted time for use in next session.
D	120	Indiv. or SG	Selecting and Programing Learning Experiences for Instructional Unit 1. Instruct participants that they are to select learning experiences for their instructional units prior to programing them for incremental learning. Suggest the following procedure: a. List all learning experiences considered.

Exercises in Selecting and Programing Learning Experiences

Sequence	Time	Group	Activity
			b. Check each activity against the Criteria for Selecting Learning Experiences, pages 148-150 of Rationale for Curriculum Development. c. Delete those learning experiences which fail to meet criteria. d. Use Criteria for Programing Learning Experiences, pages 150-153 of Rationale for Curriculum Development, as a reference, arrange learning experiences in a sequential order for learning.
E	30	SG	Evaluation of Selection and Programing of Learning Experiences 1. Select two participants of different grade levels to list the generalization for the unit and learning experiences as programed for their instructional units. 2. Ask each contributor to add explanatory details to learning experiences and to provide his rationale for the selection and programing of those experiences chosen. 3. Invite discussion. Should a question arise, refer participants to criteria for Selecting and Programing Learning Experiences, pages 148-153 of Rationale for Curriculum Development.

EXERCISE IN SELECTING LEARNING EXPERIENCES

Directions: You are designing a curriculum sequence to develop the following generalization and its dimensions.

Generalization: The way of living in a country is determined to a large extent by its history and the conditions for agriculture and industry.

	Relations With Others	Religion	Customs	Agriculture	Industry	Government
Japan						
India						

Using the three criteria listed below (refer to Rationale for Curriculum Development, pages 142-153 for additional information), evaluate the ten Learning Experiences listed on page 387 to determine those experiences you would retain, and those you would discard, for developing the above generalization.

Criteria For Selecting Learning Experiences

1. Serve to develop the generalization being taught
2. Serve a justifiable and identifiable function
3. Provide for multiple learnings within each learning activity

EXERCISE IN PROGRAMING LEARNING EXPERIENCES

Directions: Now that you have selected a set of learning experiences for developing generalizations about Japan and India, place them in a logical sequence which will result in students acquiring data and interpreting it for generalizations. Use the following six criteria for this process. (Refer to Rationale For Curriculum Development, pages 142-153 for additional information.)

Criteria for Programing Learning Experiences

1. The total sequence of learning experiences needs to provide a balance among the four objectives: (a) knowledge, (b) skill, (c) attitude, (d) cognitive process.
2. They must be arranged in a sequential order. Each experience must provide a foundation for the succeeding experience.
3. Learning experiences must increase the pupil's ability to think, to perform and to refine the required skills by proceeding in "bite-sized" increments.
4. They should provide an opportunity for the pupil to apply old knowledge in new contexts.
5. Such experiences provide systematic rotation of intake of information and a means of expressing the new concept or reorganized concept.
6. They provide for learning by many diverse means.

LEARNING EXPERIENCES

1. On a relief map of Asia, have students locate the monsoon countries. Note land formations.

2. Show overhead transparencies, "The Monsoons and Indian Society." (Consists of six transparencies showing crop production, distribution of population, wind direction during monsoon seasons, land forms and amount of rainfall.)

3. Divide class into groups for Japan and India. Have pupils gather factual data on the following topics: (a) religion, (b) customs, (c) relations with others, (d) agriculture, (e) industry, (f) government. List all sources of data. Retain all notes for future use.

4. Organize data collected by students into an information display concerning each specific country. Interpret for generalizations.

5. Dress dolls in representative dress of India and Japan.

6. Select a member of each group to make arrangements with a local variety store, gift shop, wearing apparel shop, jewelry store and a lumberyard for a visitation to gather information on the number and cost of items each imports from Japan and India. Chart information as follows:

	Products	Cost
Japan		
India		

7. Show film: Japan's Geography: Human and Economic. Interpret for relationships. (Surveys the contrast evidenced in Japan's topography, climate, economic and social life in the character of the people. Places emphasis upon the human and natural resources of the nation and the modern changing economy.)

8. Visit an art museum to study art of Japan and India.

9. Read Kipling's "Mandalay." Interpret for feeling.

10. Invite a person who has lived in one of the Monsoon Asian countries to share his experience with the students.

EXERCISE IN ORGANIZING AN INFORMATION DISPLAY

Your class has been involved in a study of the monsoon countries of Asia. During the past several days you have been divided into groups with the responsibility of researching information about the countries of Japan and India. (A group assigned to each country.) The study questions which you have followed for obtaining information are:

1. What are the living patterns and customs of the people?
2. What are their religious beliefs?
3. What is their governmental system?
4. What are the industries?
    - Raw Materials - Source?
    - Markets?
5. What conditions exist for agriculture?
    - Climatic Conditions?
    - Topographical Conditions?
6. What are the agricultural products?
7. What is their history of relationships with other countries?

Factual data has been obtained by utilizing the following sources:

Basic Text
Reference Books
Periodicals
Newspapers
Films
Filmstrips
Resource Speaker

Each group has gathered data concerning its assigned country. All members of the class, regardless of their committee assignment, have viewed the same films and filmstrips and heard the same stories and resource speaker.

The notes on the following pages represent a portion of the data obtained.

RESEARCH NOTES ON JAPAN AND INDIA

JAPAN

Spencer, Cornelia. Japan. New York: Holiday House, 1948.

Commodore Matthew Perry made two visits: First, four ships; Second, ten ships, no fighting, exchange of courtesies. Showed ships, cannon, clocks, perfumes, liquors, rifles, sewing machine, telegraph, miniature railroad. In 1853, Japan urged to open to trade with other countries after 200 years of isolation. Beginning of modern period.

Treaty of Koneqgawa opened some ports to American ships. End of Shoqunate and beginning of feudal period. Emperor came forward.

Less than 50 years later, great manufacturing country. Students sent to United States and Europe. Compulsory education. Normal schools. Asked help from French to prepare criminal code; English to build railways; Italians, art; Germans, army and doctors; Americans, education, agriculture, colonizing plans. Waterfalls harnessed. Brought in raw materials; manufactured goods exported.

In 85 years population doubled. Islands cramped, therefore, began conquests. 1931, war against China. 1941, attacked Pearl Harbor. Second largest empire in world. 1945, defeated.

United States occupation caused major changes.

Buell, Hal. Festivals of Japan. New York: Dodd, Mead, 1965.

Japan, land of festivals, many more than in United States. Spend much time and money on festivals. Origins in historical events, religion, legends. Buddhism main religion, life full of suffering, self-study for enlightenment. Shintoism: basic goodness of man, ancestor worship. Modern Japan, festivals very commercial. Matsuri: celebrate special day of neighborhood god, each neighborhood has own particular god, some Matsuri deeply religious, most today for fun and celebration. Hana Matsuri: Flower Festival, honors Buddha's birth, observed since 606 AD.

"Government." The World Book Encyclopedia. Chicago: Field Enterprises Educational Corp. Volume 10, page 39, 1961.

Political power centered in two houses of parliament: House of Representatives elected every four years, House of Councillors elected every six years, Prime Minister elected by parliament from one of its members, Emperor, many ceremonial duties, no power. Men and women over twenty eligible to vote.

INDIA

Modah, Manorama R. The Land and the People of India. New York: Lippincott, 1952.

Constitution provides secular government, freedom of worship, full adult suffrage. Individual states have governing bodies. Economically second only to United States and Russia, vast natural resources, extensive seacoast. Average income $50 per capita annually. Technical education being promoted. Colleges of agriculture increased. Two thousand graduate students sent abroad annually for technical training and scientific research. In first local elections, nearly one-third of offices went to women. Largest democratic country in Asia. Cities of India modern. Life of middle and upper classes Western. Much of life--80 percent--outside cities, same as 1,000 years ago. Average life span, 23. Indian household large, usually three generations. Modern public sanitation meager due to cost, laxity of government, lack of information, poverty of people. First chance at education given to boys. Girls usually become teachers, nurses, doctors. Take active part in politics. Marriage of younger relatives one of greatest responsibilities of older relatives. Always have right to refuse mate. Marriage not based on romantic emotion, but considered most serious business of life. Eldest persons in household act as umpires. Farmers and unskilled laborers comprise 80 percent of population, probably poorest men in world.

Ran, Santha Rama. This is India. New York: Harper, 1954.

Great concern with jewelry due to economic factor. Hindu law: woman's property consists only of her jewelry, clothes and silver given for her wedding. Husband cannot take them away, sell them or use them in any way. Pass on to daughters. Ten percent literacy rate.

Bowles, Cynthia. At Home in India. New York: Harcourt, Brace, 1956.

Women usually bring water from wells, balancing it in earthen jar on head. At time of marriage, girl given much jewelry--bangles, armlets, anklets, nose pieces, earrings, ornaments, necklaces--mostly heavy silver. Cause of villager's load of debt. Fifty percent of Indians die before 12, 25 percent in first year. Causes: poor diet--little protein, almost no vegetables, careless treatment of children, lack of cleanliness. Most marriages occur when girl from 9-15 years old. Usually bride does not live with husband until 17 or 18; rarely have children before 17. Recent law decrees girls must be 15, boys 18 to marry. Some Moslem women observe strict purdah--wear a burkha (shapeless, baggy garment covering entire body and face) whenever outside home to keep nonfamily men from viewing face.

Research Notes on Japan and India

Raman, T. A. Let's Read About India. Grand Rapids: Fideler, 1950.

One-half size of United States, almost three times population. Three-fourths population Hindu. Ganges waters largest continuous area of farmland in world. Great range of climate from dry cold to extreme damp heat. Rich soil watered by rivers and monsoons. By 1857, England had established control over most of India. In 1877, Queen Victoria titled "Empress of India." British set up elected municipal, provincial, national legislatures, appointed Indians to high office. 1947, Britain gave up control of India. Pakistan separated from India. India democratic republic with elected President, elected Parliament, Supreme Court. Government similar to United States. Women full voting rights. Caste discrimination illegal. 400 million people. Many races and religions. 25 million aborigines, 87 million Moslems, 1/4 million Buddhists, 6 million Christians. Four castes in Hindus: (1) priests; (2) warriors; (3) traders; (4) workers. Distinguished by marks on forehead. Caste system losing rigidity. Oxcart most common transport. Fourth largest rail system in world. Much variety in transport: camels, elephants, busses, airplanes. Second to United States in cotton production. Jute, lac for phonograph records, shellac, sugar cane, one-half world's tea. Rice and wheat principal food crops. Iron, coal, manganese, mica, sulphur, bauxite, gold, emeralds. Lacks oil. Few resources fully developed. Cotton industry grown greatly in 20 years. Jute mills. Salt. Steel mills. Cement, sugar, leather, soap factories. Harnessing water power. One of eight leading industrial powers of world. Trend toward European clothing. Agriculture usually one crop. Hindus forbid eating of beef; Moslems do not eat pork.

FILMS

Film: Japan's Geography: Economic and Human (Julian Bryan of the International Film Foundation)

Less than 20 percent arable. Hokkaido is only area with fields large enough for grazing. Subarctic climate. Kyushu, subtropical, 80 inches precipitation. Honshu, largest island. Great contrasts. Tokyo, world's largest city. Economic growth mainly industrial. Jobs plentiful. Many earthquakes. Crowded country. No longer imitators and copiers. Developed electron microscope.

Film: Japan: Miracle in Asia (Encyclopaedia Britannica Films)

Sleep on floor, Western dress. Tokyo, most rapidly growing city in world. Japanese income three times that of 1952. Trade, lifeblood of Japan. Rice, fish, vegetables, chief diet. More meat and dairy products consumed each year. Economize rigidly on food and housing. Only United States and Israel have higher percentage in higher education. Nearly 100 percent literate. Employees meet at noon hour or after work to study languages, mainly English.

Film: Japan (Julian Bryan of the International Film Foundation)

Still retain much of ancient heritage. Ninety million people in area the size of California. Land reform. Community equipment, roadtiller. Equivalent of Thanksgiving--Rice Festival. Most large American companies have business interests in Japan. Camera industry one of best in world. Japan third best customer of America. Japan buys twice as much from United States as she sells to United States. Hydroelectric power. Constructs more ships than any other nation. Imports raw materials to manufacture.

Film: Japan: Harvesting the Land and the Sea (Encyclopaedia Britannica Films)

Extremely poor in natural resources a nation needs. Rivers short; mostly unnavigable. Used for hydroelectric power. Eighty percent mountains. Sixteen percent arable. Intensive cultivation. In 1953, fifty percent farmers; today, thirty percent farmers. Predict eleven percent farmers by 1970. Rice most important crop, two ton per acre. Highest productivity per acre in world. Experts in plant genetics. Twelve years of education provided; first nine years compulsory. Over ninety-nine percent can read and write. Written language one of most illogical and complicated ever invented. Fish largely replace meat; more important than in any other country.

Film: India: A Better Tomorrow (Baily Film Associates)

Freedom from Britain 1947. Religion extremely important:
- Christianity
- Islam or Mohammedanism
- Buddhism

Films

Hinduism (Brahmanism) - 80 percent

Reincarnation; cows sacred; Benares, most holy place; caste system, 4,000 years old, division according to laborers, Brahman-priests, intellectuals; outcasts, untouchables, no social standing; women little more than beasts of burden and servants of men; being given more rights, can vote.

Conglomeration of types of transportation. Best transportation system in Asia, but oxcart main means. Farming--primitive methods of ancestors. Rice, basic food crop. Leads world in sugar cane production. Jute leading export. Taj Mahal, early 16th century. Calcutta, largest city, striving toward an industrialized economy. Gandhi, Nehru were leaders.

SENSITIVITY TO INTERPRETING AN INFORMATION DISPLAY

Content:	A sensitivity experience: With the instructor as the teacher, and the participants as students, the process of interpreting an information display is role played.
Leadership Materials:	Sensitivity to Interpreting An Information Display, Leadership Notes
Rationale:	To provide a sensitivity experience to the intellectual and emotional processes involved in interpretation of data
Objective:	During the process of role playing an experience in interpretation of data, participants will demonstrate their intellectual and emotional involvement in the process by actively portraying their assigned role with demonstrated interest. Following the activity, they will further demonstrate both intellectual and emotional involvement by personally recalling and stating their feelings and understandings.

SENSITIVITY TO INTERPRETING AN INFORMATION DISPLAY Leadership Notes

The purpose of this activity is to sensitize participants to intellectual and emotional processes involved in the interpretation of an information display.

Using the curriculum development theme of comparing and contrasting Japan and India, the process of interpretation of data is illustrated by having participants interpret the information display which they have just completed.

Sequence	Time	Group	Activity
A	30	SG	Role Playing Interpretation of Data

1. Organize the charts which were collected at the close of the last exercise, on organizing an information display, and display on a wall in the following manner:

	Relations With Others	Religion	Customs	Agriculture	Industry	Government
Japan						
India						

2. Indicate that this is a role-playing experience designed to sensitize participants to the process of interpreting an information display.
3. Conduct the following question sequence:
    a. What did we find out about Japan and India in relation to their religion?

Sequence Time Group Activity

Expect both facts and generalizations. When generalizations are given, ask for substantiation.

b. Repeat the above question for customs, agriculture, industry, government and relations with others.

c. How are these two countries alike?

d. How are they different?

e. How do you account for these differences?

f. What generalization could we make that might include all of these ideas? Or, what generalization could be made that might apply to any group of people?

4. Give attention to opportunities to:

Clarify Content: "What do you mean by ________?"

Summarize Content: "Could you give us the main idea of that?"

Pursue Thoughts: "What would be the result of that?"

Deal With Overgeneralizations: "Is that true for every group of people?" "How do you know?"

B 30 SG Analysis of Process

1. After the role-playing activity, conduct the following question sequence for the purpose of analyzing both the intellectual and emotional

Sequence	Time	Group	Activity
			processes which participants experienced.

a. How did you feel while going through this process?

b. How do you account for these feelings?

c. What intellectual operations were called for?

Analysis of Relationships

Organization of Relationships

Generalizing

Providing Logical Proof

d. What were your feelings related to the intellectual processes?

e. How could we summarize what this activity calls for?

The ability to perceive and verbalize relationships, to generalize from specific data and to present logical proof.

2. Discuss any questions and concerns. However, indicate the process will be broken down into its component parts and carefully analyzed in subsequent activities.

PROCESSES IN INTERPRETATION OF AN INFORMATION DISPLAY

Content: A knowledge base presentation is made to the large group which gives the techniques for implementing the processes in interpreting an information display.

Leadership Materials: Processes in Interpretation of an Information Display, Leadership Notes

Participant Materials: Processes in Interpretation of an Information Display

Rationale: To provide a knowledge base of theory and technique to which subsequent activities will be related

Objective: Following a large group, formal presentation on the theory and techniques for processes of interpreting an information display, participants will demonstrate understanding of the theory and techniques by successfully completing the subsequent activities.

The purpose of this presentation is to provide a knowledge base for the subsequent simulation and laboratory experience. It may be conducted in one of two ways.

I. Illustrated Lecture

II. Reading of Processes in Interpretation of an Information Display

Sequence	Time	Group	Activity
I	10	LG	Illustrated Lecture Those leaders who feel quite secure with the content and processes of this instructional program should develop their own presentation, taking care to include the theory and techniques which are presented in the following material.
II	10	LG	Reading of Processes in Interpretation of an Information Display Ask participants to read Processes in Interpretation of an Information Display. Indicate that reference will be made to the Summary of Teaching Strategies shown there.

PROCESSES IN INTERPRETATION OF AN INFORMATION DISPLAY

In the last exercise, an information display that compared and contrasted several dimensions of knowledge concerning Japan and India was interpreted. The processes involved are examined below in greater detail.

As indicated in the previous discussion of Interpretation of Data Processes, the first step of the process is one of asking an open-memory question. This question calls for a body of facts, concepts and ideas. It is particularly important when interpreting a story or film where there is an initial need to review the content prior to focusing on specific details.

However, the interpretation of the information display on Japan and India started by asking a focusing-memory question. Although somewhat "open" because it allowed for a great deal of freedom of response, it nevertheless called for Step 1, recall and analysis of data. It asked specifically, "What did we find out about Japan and India in relation to their religion?" Each person was asked to examine and state specific information from the chart.

This initial question was followed by a series of focusing questions that called for recall and analysis of specifc information. Situation 1 dealt with religion. Situation 2 dealt with customs. Situation 3 was concerned with agriculture. The questioning process was continued until the specific data on the chart was reviewed and analyzed. The second step asked a series of interpretation questions that called for an analysis and statement of relationships. The first interpretive question was, "As you look at the chart, how are these countries alike?" The second was, "How are they different?" And the third was, "How do you account for these differences?" All three questions asked the individual to compare, contrast, analyze and verbalize relationships within the data.

Finally, an inclusive-interpretation question was asked which called for a generalization. The question was, "What generalizations could we make that would include all of these ideas?" It was at this point that each person stated those high level abstractions that he felt could be logically supported by the data.

Thus, interpretation of an information display follows the same procedure as does the interpretation of a story or film.

The discussion is usually initiated with an open-memory question, designed (a) to elicit a universe of facts, concepts and ideas upon which to operate, and (b) to provide an opportunity for every student to become initially involved in the discussion.

The discussion skills of accepting, supporting and mapping are important techniques, of course, for use with this type of question.

The open-memory question is invariably followed by asking a series of two or more focusing-memory questions, designed to focus on specific points to be compared, contrasted and related.

Following the analysis of this specific information, one or more interpretation questions are asked to elicit this comparing, contrasting and relating of specific points within the field of data.

Finally, the inclusive-interpretative question, requiring the student to verbalize high level abstractions, is asked to foster a conclusion, summary, inference or generalization.

Processes in Interpretation of an Information Display

All through the discussion, attention is given to the discussion skill of substantiating, that is, asking the student to extend and support his ideas.

In summary then--regardless of the source of the content, whether it be a story, a film or an information display, the process of interpretation of data is basically one of moving the students from specific factual data, through an analysis and statement of relationships within the data, to the verbalization of high level abstractions which can be logically supported by the data.

When a student can verbalize generalizations which are relatively abstract, inclusive of much data, and qualified by a statement of condition, he has achieved the goal of the process.

The following summary reviews the specific strategies for planning and implementing the interpretation of data process. Refer back to the concluding pages of Processes in Interpretation of Data for a more detailed statement.

Summary of Teaching Strategies

Open-Memory Question

Objectives: To elicit a universe of facts, concepts and ideas upon which to operate.

To provide an opportunity for every student to become initially involved in the discussion.

Initial Question

Ask an open question which calls for recall or reading of data from the field of information being interpreted.

What did you see in the film?

What happened in the story?

What did you see take place in the experiment?

What have we been able to find out about Bolivia?

Processes in Interpretation of an Information Display

Discussion Skills

Accepting: Accept all responses in a nonjudgmental manner.

Supporting: Encourage students to become involved and express their ideas.

Mapping: Attempt to gain as much information as possible.

Focusing-Memory Questions

Objective: To focus on specific points to be compared, contrasted and related to other points.

Initial Question

Ask a question (or series of questions) which focuses upon specific data.

What did the film tell us about transportation?

What feelings did Taro express at this point in the film?

What happened when we added acid?

What industries do they have in this area?

Discussion Skills

Substantiating: Ask the student to give evidence of the basis for his response. (A basic discussion skill of the interpretation process.)

Interpretation Questions

Objective: To elicit comparing, contrasting and relating of specific points within the field of data.

Initial Question

Ask a question (or series of questions) which requires the students to draw a relationship between two or more points in the data.

How did Toshi and Oji-san feel that was different from how the others felt?

How do you account for these differences?

Is there any relationship between the climate of this area and the farm products?

Processes in Interpretation of an Information Display

Discussion Skills

The main discussion skill, again, is substantiating. Ask the student(s) to support the response.

Inclusive-Interpretation Question

Objective: To move the discussion to the verbalization of high-level abstractions.

Initial Question

Ask a question which calls for:

1. Conclusion
2. Summary
3. Inferences
4. Generalizations

What conclusions could we draw from our discussion?

How could we summarize what this film has presented?

What could we say that might be true of other societies?

What generalization can you make that would include all the aspects we have discussed about Japan and India?

Discussion Skills

Substantiating: The basic discussion skill is asking for proof, particularly in the case where students have overgeneralized.

Discussion Skills Generic to Any Discussion

Refocusing: The discussion moves off focus; call it back.

Clarifying: Clarifying an ambiguous term.

What do you mean by customs?

Can you give an example?

Summarizing: Call for the idea buried in a long discourse.

Could you give us the main idea of what you are saying?

Processes in Interpretation of an Information Display

Mapping Field: Obtain as much information as possible.

Is there anything else that you would like to mention?

EXERCISES FOR INTERPRETING AN INFORMATION DISPLAY

Content: A series of simulation exercises have been designed to provide experience with the specific skills required in the interpretation of an information display.

Leadership Materials: Exercises for Interpreting an Information Display, Leadership Notes

Participant Materials: Restricting Words

Two Colonies of People

Scrambled Question Sequence: Interpreting Factual Data

Pursuing an Individual Response

Evaluating Generalizations

Rationale: To develop skill in the specific techniques needed to conduct effectively the process of interpreting an information display

Objective: Following a series of simulation exercises designed to develop skills in the process of interpreting an information display, participants will demonstrate understanding of the process by developing an information display and designing a question sequence for its interpretation. Subsequently, they will demonstrate the necessary skills in a laboratory experience in a classroom.

EXERCISES FOR INTERPRETING AN INFORMATION DISPLAY

The following simulation activities are designed to develop specific skills necessary to implement the process of interpreting an information display.

Sequence	Time	Group	Activity
A	20	SG	Restricting Words 1. Open the exercise by asking: "What did you learn from me yesterday?" Expect rather complete and profound silence from this presumptuous question. Then ask: "Why were you uncomfortable with that question? What was wrong with it?" Expect several responses, dealing mostly with "being put on the spot." 2. Refer to the exercise on Restricting Words. 3. Divide group into subgroups of three to five members. Ask them to read and respond to the directions. 4. After approximately 15 minutes, reconvene total small group and share responses.
B	20	SG	Two Colonies of People 1. Refer to the chart on Two Colonies of People.

Exercises for Interpreting an Information Display

Sequence	Time	Group	Activity
			2. Indicate that this represents an information display with a portion of the factual data that was obtained in a study of two early American colonies. 3. Divide group into subgroups and ask that they study the chart and discuss the following question: "How do you account for the differences 50 years later?" *This question is designed simply to get them involved intellectually and emotionally with the content on the chart.* 4. After approximately 10 minutes, reconvene and share.
C	30	SG	Question Sequence - Interpreting Factual Data 1. Refer to the exercise on Scrambled Question Sequence: Interpreting Factual Data. 2. In previously arranged subgroups of three to five members, ask participants to read and respond to directions as indicated on the exercise. 3. After approximately 10-15 minutes, reconvene total group. Ask each of the small groups to present their question

Sequence	Time	Group	Activity
			sequence and give their rationale for that particular sequence. *The important factors are that they have carefully thought through what the response is likely to be for each question, and that the sequence builds sequentially and accumulatively to the generalization level.*
D	30	SG	Individual Responses 1. Refer to the exercise on Pursuing an Individual Response. 2. Indicate that you are now playing the role of a student and they are collectively playing the role of the teacher. Go through the exercise playing your role as follows: a. The differences were due to the differences in nationalities within the countries. *You are aware of the fact that the more differences in people, the more likely to result in differences in schools, political parties, etc. Be explicit if they ask you to justify your response.* b. It sounds like schools are the main part of both colonies. *You are just a bit "slow," and in this case you are referring strictly to the fact that for Colony I, two of the four factors in column three deal with schools, and for Colony II, two of the five factors deal with schools.*

Sequence	Time	Group	Activity

c. The reason there's strikes in Colony II is because it's unionized.

This is an overgeneralization, of course, but if they push you to be explicit, point out that it's industrialized, "seaport, natural resources and labor," and where you have this you have unions--and where you have unions, there are going to be strikes.

d. The reason there are strikes and things like this in Colony II is because it has a seaport and more people came in from other countries.

In this case, you are pretty sure of yourself, but let them push you to a statement of condition, i.e., "Probably one of the reasons that...."

e. End by discussing "when" and "how" you pursue an individual response.

1. When there is need for clarification.
2. When it seems appropriate to ask for substantiation.
3. The emotional tone is extremely important. Never nail a child to the back of his seat.

Sequence	Time	Group	Activity
E	30	SG	Evaluating Generalizations

1. Refer to the exercise on Evaluating Generalizations.

Exercises for Interpreting an Information Display

Sequence Time Group Activity

2. Ask participants to work as individuals to read and respond to the directions. While participants are working, put the following chart on the board.

	+	-
1		
2		
3		
4		
5		
6		
7		

3. After approximately 10-15 minutes, reconvene total group and tally their responses on the chart. Simply ask, "How many gave number one a plus? How many gave number one a minus?," until all categories have been covered.

4. Identify the three with the most plus tallies. Ask, "What do these have in common?" List responses on the board:

   Abstract--inclusive terms
   Statement of condition
   Inclusive of much data

Exercises for Interpreting an Information Display

Sequence	Time	Group	Activity
			5. Examine the three with the most minus tallies. Discuss them in relation to their common properties.
			6. Close by indicating that we, as teachers, need to be alert to the level at which students generalize. Many students, conditioned to function at the memory level, will be frustrated at first when asked to generalize from specific data; will then move to a tendency to overgeneralize; and, finally, if we insist, will function at a very effective level.
F	60	SG	Constructing a Sample Information Display and Interpretation Question Sequence 1. Indicate to participants: a. That between now and the next session they should insert sample factual data in each of the cells of the illustrative model which they will utilize in their instructional unit. *Explain that they may use whatever resources they have available, including their own stored knowledge, and each other, as sources for this factual data.* b. That following the charting of this specific data, they should develop a question sequence, to be used in

Sequence	Time	Group	Activity
			interpreting the data, which moves the discussion from specifics, to relationships, to the generalization. c. That they also should indicate the anticipated responses to each question. NOTE: This is a good assignment to take home.
G	30	SG	Evaluation of Information Displays and Questioning Sequences for Interpretation 1. Select two volunteers representing different grade levels to put their generalization for their units, their question sequence and their anticipated responses on the board. Ask them to exhibit their information displays. 2. Discuss information displays in relation to: a. Legibility b. Comprehensibility c. Adequacy of information d. Relevancy to dimension headings 3. Analyze question sequences in relation to these questions: a. Do they progress logically from specifics, to relationships to the generalization? b. Will they logically result in the anticipated responses?

RESTRICTING WORDS

We often, inadvertently, "emotionally load" our questions with words that tend to bind the discussion, rather than to free it. Make the following questions more open first by deciding what the restricting words are, and then by rewording the question to eliminate the restrictions.

1. What important ideas were in the film?

2. What did we learn from our resource speaker?

3. What did we learn on our field trip?

4. What did you like about the story?

TWO COLONIES OF PEOPLE

	Nationality of settlers	Description of location where colonists settled	50 years later
COLONY I	English	Forests	The same political party had been in power for forty years.
		Temperate climate	
		Fine agricultural land	All the schools taught exactly the same subjects, used the same texts.
		Water for power	
		Few mineral resources	The same schoolboard members were elected over and over.
		Land-locked	There had been no strikes.
		Considerable distance to sea	
COLONY II	English	Forests	Several different political parties had been in power.
	Germans	Temperate climate	
	Scotch-Irish	Poor farm land	There was a history of political strife.
	Swiss	Water for power	Both public and private schools were functioning. People argued about the best texts.
		Coal, iron	
		Seaport	Schoolboard members were constantly being replaced.

SCRAMBLED QUESTION SEQUENCE: INTERPRETING FACTUAL DATA

Rearrange and/or refine the following questions to present a logical question sequence designed to call for generalizations from the data in the chart, Two Colonies of People.

1. What differences do you see in the locations of the colonies?

2. Based upon the information given in the chart, what could you say that might be true for other groups of people?

3. What do you see as you look at this chart?

4. How do you account for the differences between the colonies 50 years later?

5. What similarities do you see in the locations of these colonies?

PURSUING AN INDIVIDUAL RESPONSE

The following statements were made by children in answer to the question, "How do you account for the differences between the colonies 50 years later?" How and why would you respond to each statement?

1. The differences were due to the differences in nationalities within the countries.
2. It sounds like schools are the main part of both colonies.
3. The reason there's strikes in Colony II is because it's unionized.
4. The reason there are strikes and things like this in Colony II is because it has a seaport and more people came in from other countries.

EVALUATING GENERALIZATIONS

The following generalizations were made by sixth grade children during a discussion of the chart, Two Colonies of People. Indicate with a plus sign (+) the three that you consider to be the highest level (most abstract and inclusive generalizations), and with a minus sign (-), the three that you consider to be the lowest level.

1. The location of a country affects its progress.

2. Both colonies had about the same description.

3. The reason for the strikes and riots was probably because the different nationalities had different ideas and were fighting over them.

4. Colony I relies on agriculture for its economy. Colony II must rely on exports and imports.

5. The conditions, geographical and climatic, under which a country starts affects the growth, the government and how the people live in that country.

6. The reason that the same people in Colony I were elected over and over was because there wasn't so much population.

7. Colony II had strikes and riots because they had minerals for industry. Colony I was mostly farmers, and farmers usually don't strike.

DEMONSTRATION OF INTERPRETING AN INFORMATION DISPLAY

Content: Either a typescript, a live or a videotaped demonstration is used to illustrate the processes in interpreting an information display.

Leadership Materials: Demonstration of Interpreting an Information Display, Leadership Notes

Participant Materials: Japan and India Information Display

Interpretation of Data Typescript

Interpretation of Data Observation Guide

Rationale: To refine understanding of and skill in the processes of interpreting an information display

Objective: Following a guided observation and discussion of a demonstration of interpreting an information display, participants will show their understanding of the processes by the data collected during the demonstration and by predicting how they will apply the data to their own teaching style and situation.

The purpose of the demonstration is to illustrate, in a classroom setting, the specific processes involved. A live demonstration should be conducted by an individual highly skilled in the process. However, the activity may be conducted using one of the alternative techniques listed below.

I. Typescript
II. Live Demonstration
III. Videotaped Demonstration

I. The typescript can be read in advance and has the advantage that questions can be predesigned to focus attention on specific elements of the process.

II. A live demonstration conducted by a skilled leader (though its results may not be as predictable) elicits more personal involvement of participants in the analysis of the process.

III. A local videotaped demonstration conducted by a skilled leader, while not eliciting the degrees of personal involvement of the participants of a live demonstration, has the advantage of showing the students and teacher in action. At the same time, a review of selected parts of the demonstration may be made. The leader can preview the tape and design questions to emphasize salient points of the process.

Sequence	Time	Group	Activity
A	20	LG	Planning of Demonstration I. Typescript 1. Read typescript in advance. Determine the specific points

you wish to call attention to in the reaction discussion. Add points to the observation guide if you feel this would be helpful.

II. Live Demonstration

1. Arrange for the use of classroom(s) for demonstration(s). If participants represent several grade levels and/or subject matter areas, and if time and personnel permit, it is suggested that several simultaneous demonstrations be given.
2. It may be advisable to visit or write the teacher of the cooperating class in advance to insure a normal classroom situation. (See the sample letter in the Preinstructional Arrangements, page 36.)
3. Arrange for appropriate seating for observers.

III. Videotaped Demonstration

View tape in advance. Determine strategies to be emphasized. Be

Sequence	Time	Group	Activity
			sure tape has audible sound and a clear picture so participants can follow the interpretation of data process.
B	20	SG	Predemonstration Instructions 1. Refer to Interpretation of Data Observation Guide. 2. Go over the guide carefully to be certain the participants understand what they are looking for. The data they collect will be utilized in the reaction discussion. Indicate: a. If the initial question asked is an open question, record data called for at this point, and proceed with recording all subsequent data. b. If the first question is a focusing-memory question, ignore Section I, record the question under Focusing-Memory Question, and proceed to record from that point on. 3. Give clear directions as to time and place if live demonstrations are being conducted. Ask observers to be a few minutes early to avoid stragglers.

Demonstration of Interpreting An Information Display

Sequence	Time	Group	Activity
C	40		Demonstrations I. Typescript 1. Read typescript with participants assigned to take data utilizing the observation guide. II. Live Demonstration 1. Use whatever information display is comfortable for you, as well as appropriate for the group of students with whom you will be demonstrating. (If possible, use the same group of students employed for the *Concept Diagnosis* demonstrations.) If the demonstrator has no strong preference for other material, it is suggested that he use the *Japan and India Information Display* from the Participant Materials. The use of this material provides reinforcement of skills previously acquired by the participants. a. During the predemonstration instructions session, refer to *Japan and India Information Display*; indicate you will

Sequence Time Group Activity

be asking students to interpret this material.

b. Prior to the demonstration, either develop a large chart of the information display (which is preferred) or duplicate enough copies of the display to distribute to each student. (If a chart is developed, be certain it is large and legible enough for all students to be able to see and read easily.)

c. Basically, the same question strategy which was utilized in the activity, Sensitivity to Interpreting an Information Display, has been found to be effective with students who see this material for the first time.

1. "As you look at the chart, what do you notice about Japan and India in relation to their religion?" (Repeat for customs, agriculture, industry, government, and relations with others.)

2. "As you look at the chart, how are these two countries alike?"

3. "How are they different?"

4. "How do you account for these differences?"

5. "As a result of our discussion of these two cultures, what generalizations, or statements, could be made that might be true of other cultures?"

Demonstration of Interpreting An Information Display

Sequence	Time	Group	Activity
			III. Videotaped Demonstration 1. View tape with the participants assigned to record data utilizing the observation guide.
D	30	SG	Reaction to Demonstration

The purpose for providing participants this opportunity is to allow them to react to the demonstration:

> To provide an opportunity to discuss what was observed and to identify professionally and personally with others at their same grade level or subject area.

Procedures

1. Discuss each of the points on the observation guide. Try to obtain accurate and objective data. When value judgments are offered, ask for supporting evidence. Stick to process. If possible, avoid discussion of management.
2. Ask for expressions of problems or concerns relative to making an application of this process to their own teaching situation. Allow the

Sequence	Time	Group	Activity
			other participants to react to the concerns. Direction from the group is likely to be more persuasive than from the leader at this point. For example, a primary teacher may state:

> "I can see how it's done with upper grade and secondary kids who can read, but I still don't see how an information display can be made for kindergarten and first grade children."

Group discussion of the concern is very likely to result in the obvious answer that an information display doesn't necessarily have to be in the form of a written chart. Murals, displays and exhibits which compare and contrast specific information are also "information displays."

JAPAN AND INDIA INFORMATION DISPLAY

Japanese Relations With Others

In 1853, Commodore Perry of the U.S. arrived in Japan with a squadron of warships to urge Japan to open trade with other countries after 200 years of isolation. This marked the beginning of Japan's modernization.

In 1904, Japan defeated Russia.

In 1910, Japan annexed Korea.

The U.S. defeated Japan in 1945, to end World War II. U.S. occupation after World War II caused major changes.

The Japanese used ideas from many nations:

1. Chinese, writing and architecture
2. French, criminal code
3. English, railways
4. Italians, art
5. Germans, army and doctors
6. Americans, education, agriculture and colonizing plans

Students are sent to U.S. and Europe to be educated.

Japanese Religion

Buddhism is the main religion of Japan. It teaches a life full of suffering and self-study for enlightenment.

Shintoism believes in the basic goodness of man and ancestor worship.

Many of the festivals, called Matsuri, are deeply religious, such as Hana Matsuri (Flower Festival) honoring Buddha's birthday.

Japanese Customs

Japan is a mixture of traditional and modern, much of the modern being adopted from the West.

Much of the ancient heritage is still retained, such as the numerous festivals. A great deal of time and money is spent on these festivals, which have their origin in historical events, religion and legends. However, most of the festivals today are for fun and celebration.

Each neighborhood has its own particular god.

Most Japanese still sleep on the floor and have little furniture in their homes. They may wear Western dress to work, but most change to traditional when home.

They economize rigidly on food and housing.

Over 99 percent can read and write. Twelve years of education are provided, with the first nine years compulsory.

Only Israel and the U.S. have a higher percentage in college.

JAPAN AND INDIA INFORMATION DISPLAY

Indian Relations With Others

By 1857, England had established control over most of India. In 1877, Queen Victoria was titled "Empress of India."

The British set up elected municipal, provincial and national legislatures, appointed Indians to high office.

In 1947, Britain gave up control of India. Pakistan shortly thereafter separated from India.

Two thousand graduate students are sent abroad annually for technical training and scientific research.

Indian Religion

India is a country teeming with 400 million people, composed of many races and religions; 25 million Aborigines, 87 million Moslems, 25 thousand Buddhists, 6 million Christians.

The once rigid caste system based in religion, has been outlawed and is losing its rigidity.

Religion plays an extremely important role in India. It is the reason for the sacred cows which cannot be eaten by Hindus, the prohibition of pork for Moslems, and the designating of certain areas as holy places, such as the Ganges.

Until recently, women were regarded as little more than beasts of burden and servants of men.

Some Moslen women observe strict purdah, the wearing of a shapeless, baggy garment to cover the entire body and face to keep nonfamily men from viewing their face.

Indian Customs

Cities of India are modern. Life of the upper classes is western. Much of the life outside the cities, 80 percent, is the same as it was 1,000 years ago.

Indian households are usually large, composed frequently of three generations. The eldest persons in the household act as umpires.

First chance at education is given to the boys; girls become teachers, nurses, doctors.

Women bring water from wells, balancing it on their heads.

Until recently most marriages occurred when a girl was from 9 to 15 years old. Usually the bride did not live with her husband until 17 or 18, rarely having children before 17.

Recent law decrees that a girl must be 15 to marry, boys 18. Marriage is considered the most serious business of life. At the time of marriage, girls are given much jewelry--bangles, armlets, anklets, earrings--because Hindu law decrees that a woman's property consists only of her jewelry. Husband cannot take it or use it in any way. The jewelry is passed on to the daughters.

JAPAN AND INDIA INFORMATION DISPLAY

Japanese Agriculture

Eighty percent of Japan is mountains, sixteen percent is arable. Only Hokkaido has fields large enough for grazing. Rainfall averages 80 inches per year.

Intensive cultivation methods are used to get the highest yields per acre in the world. The Japanese have become experts in plant genetics.

Rice is the most important crop with productivity of two tons per acre.

In 1953, 50 percent of the Japanese were farmers, today 30 percent are. By 1970, it is predicted only 11 percent will be.

Rice, fish and vegetables are the chief products with more meat and dairy products being produced each year to meet the increasing demand.

Farm equipment is frequently community owned.

Japanese Industry

Japan is extremely poor in natural resources, yet less than 50 years after Perry's visit, Japan was a great industrial nation.

The rivers are short and unnavigable, but the many waterfalls help provide hydro-electric power.

Economic growth is mainly industrial and jobs are plentiful. Raw materials are brought in and exported as manufactured goods.

Japanese manufacturers are no longer imitators and copiers. The electron microscope was developed by the Japanese. Their camera industry is one of the top in the world. They construct more ships than any other nation.

Japan is America's third best customer. She buys twice as much from the U.S. as she sells to it. Most large American companies have business interests in Japan.

Trade is the basis of Japan's economy. Japanese income today is three times what it was in 1952.

Japanese Government

Political power of Japan is centered in two houses of Parliament. Members of the House of Representatives are elected every four years. Every six years members of the House of Councillors are elected.

The Prime Minister is elected by Parliament from one of its members.

The Emperor has many cermonial duties, but no power.

Men and women over 20 are eligible to vote.

JAPAN AND INDIA INFORMATION DISPLAY

Indian Agriculture

The Ganges River of India waters the largest continous area of farmland in the world. Throughout India, the rich soil is watered by rivers and monsoons.

Agriculture is usually devoted to one crop. Rice and wheat are the principal crops. Other crops include cotton, tea, jute and sugar cane.

Many cattle are raised, but not utilized due to religious beliefs.

Colleges of agriculture are being increased.

Farmers and unskilled laborers comprise 80 percent of the population.

Indian Industry

Although India is one of the eight leading industrial powers of the world, and is economically second only to the U.S. and Russia, and despite its vast natural resources and extensive seacoast, the average annual income per capita is only $50.

Possessing the fourth largest rail system in the world and the best transportation system in Asia, India's transportation ranges from camels, elephants and buses to airplanes; oxcart is the most common.

Few resources are fully developed. Industry includes: second to U.S. in cotton, half of the world's tea; iron, coal, manganese, mica, sulphur, bauxite, gold, emeralds, jute, salt, steel, cement, sugar, soap, leather, lac for phonograph records.

India is striving for an industrialized economy.

Indian Government

India is the largest democratic country in Asia with a constitution which provides for secular government, freedom of worship and full adult suffrage.

The individual states of India each have a governing body.

In the first local elections, nearly one-third of the offices went to women, who have full voting rights.

With an elected President, elected Parliament and a Supreme Court, India's government is similar to that of the U.S.

According to law, caste discrimination is now illegal.

INTERPRETATION OF DATA TYPESCRIPT

Teacher: For some time now you've been doing research on Japan and India. Here are the charts with information on Japan and India.

Let's take a look at agriculture and industry for Japan and India. What did you notice as far as agriculture and industry is concerned for these two countries? Mark?

Mark: Well, they both have a hard time producing enough for themselves.

Teacher: All right, that's a similarity, isn't it, between the two of them? Anything else that you've noticed on the two? Mark?

Mark: In Japan, ah, 50 percent, no, 30 percent of the people are farmers, but in India, 80 percent are.

Teacher: OK, let's see if we can put those two items down now.

Lange: Well, and unskilled labor, that's for India.

Teacher: And what does that mean, Lange?

Lange: That means just like they, ah, they're working at something that doesn't require any skills.

Teacher: But you would differentiate unskilled laborers from farmers?

Lange: Is rock hauling farming?

Teacher: All right.

Betsy: It's migrant labor.

Teacher: Well, how can we put that down in a statement? If you gave us this statement, what would you do with it?

Matthew: Well, they could go together because farmers aren't really skilled laborers, but they have to be, have a certain amount of skill to farm.

Lange: Well, you could call them skilled, ah, I mean farmers and (another student joins in here)...

Teacher: OK, and India is the same?

Betsy: That would make the Japanese, ah, it just says farmers.

Lange: And say 30 percent in, ah, just don't mention anything about unskilled labor in Japan.

Interpretation of Data Typescript

Teacher: All right, in Japan 30 percent are farmers and in India 80 percent are farmers and unskilled laborers. And I think before that one, Mark had one that we didn't get down here. What was that, Mark?

Mark: That neither one can produce enough food for their own needs.

Teacher: Any other thing that you noticed? Betsy?

Betsy: Um, it's supposed to be "their," not "the."

Teacher: Their, thank you. Jim?

Jim: Well, ah, rice is the main crop for Japan and India.

Teacher: Something else? Betsy?

Betsy: Ah, you already have it up there, their main crop is rice.

Teacher: Lange?

Lange: Well, India has a great deal of natural resources and Japan has very few.

Teacher: You've made a contrast, the others have been similarities... the other statements. Now, we have a contrast or difference between the two countries. Any other statement? Carl?

Carl: In Japan there's more rainfall than in India.

Teacher: Christy?

Christy: In India, in India, the ah, rich soil is watered by the rivers and monsoons.

Teacher: Jim, another one?

Jim: Ah, in India they don't have, ah, as many cars or busses as Japan has.

Teacher: Tricia?

Tricia: In India, most of, most of the land is farm land and in Japan most of it is mountains.

Teacher: Betsy?

Betsy: Ah, in Japan the meat and dairy products are being produced to meet the demand and in India ah, cattle that could be used for meat, they don't use them because of their religion, they think that cows are sacred.

Interpretation of Data Typescript

Teacher: And you've given us the reason too. Ah, could you shorten that up just a little bit so we can get it down here?

Betsy: Um, Japan uses cows for meat and India doesn't.

Teacher: Ron, you had something?

Ron: Well, Japan constructs more ships than India does....

Lange: Or anybody, for that matter.

Shannon: We could say there's more industrial things going on in Japan than there is in India.

Teacher: All right, and what have you done when you make a statement like that?

Shannon: (No reply)

Teacher: What's she doing, Lange?

Lange: Ah, she's making a generalization about the industry....

Teacher: Industry as a whole, so we'll put that down and key it, because that's a generalization that you're giving. Would you give it to us again?

Shannon: Well, there's more industrial economy going on in Japan than there is in India.

Lange: We could say Japan is more industrialized.

Teacher: Let's take about one more from Jim and then move on.

Jim: Ah, Jap--Japan has got a better world trade than India does.

Teacher: Why do you say that, Jim?

Jim: Well, Japan has, is more industrialized and they trade more of their stuff than India does.

Lange: It has more to trade.

Betsy: And India is striving for an industrial, ah, economy.

Teacher: Now, we have some of the ah, similarities and differences between the two countries. Let's take a look at the first one that we had--neither one can produce enough food for their own needs. Why do you suppose neither country is able to produce all the food it needs? Mark?

Interpretation of Data Typescript

Mark: Well, Japan is too small and, ah, doesn't have much good land. But India could if they wanted to, but most of their people, just aren't advanced enough. They don't have farm machinery and things like that to use their land as much as they could.

Shannon: They don't have enough money *to* get farm machinery.

Lange: Japan uses chemicals and fertilizers to get the most out of their land and India doesn't have--ah, they don't know how to mechanize, ah, farming and India doesn't have--doesn't, ah, doesn't terrace it very much and they don't have very much mechanical farming and tools.

Teacher: So, if you're farming in this rather primitive method that you have described, what happens to the amount of income they have then, Shannon?

Shannon: Well, they..., they don't have, ah, as many crops and they can't get enough money from these--from *exports* and imports...you know, when they sell.

Teacher: So, they don't have enough money then to buy more machinery, do they? Keeps going around in a circle.

All right, any other things on the farming part of it? Mark?

Mark: Well, the reason Japan can use its land so well is because its industry brings so much money in they can afford to fertilize it and everything like that.

Teacher: Now, let's take a look at No. 3. Rice is the main crop of both Japan and India. How do you account for the fact that both countries could use rice so extensively? Betsy?

Betsy: Well, the only thing, the ground can't, ah, is able to produce it probably better than any other and also ah, it's just the custom to eat rice.

Teacher: Any other ideas as to why rice would be their main crop? Matthew?

Matthew: It's very inexpensive--it's the ah, it has a lot of vitamins and things like that for the least amount of money.

Teacher: Lange, another idea?

Lange: Well, the land is probably fitted to rice because rice needs, ah, a very wet, moist area to grow in.

Teacher: That's similar to what Betsy said about being suited for growing rice. Going down there to No. 8--in India most of the land is farm land and in Japan most of it is mountainous. What effect, or what would this mean to the country, if this is true? Mark, do you have some idea?

Interpretation of Data Typescript

Mark: Well, it means that if any of them have enough food in--and it has all of its land being farmed, then it's not doing it--doing the farming very well. And Japan *can't* use it, but it's still producing a lot more than India.

Teacher: Anything else that it would mean? If you don't produce--ah, if you have a lot of farm land in one country and the other country is mostly mountains, what else might it mean? Tricia?

Tricia: Well, it might mean India produces more rice than Japan because it has more farm land and Japan has mostly mountains.

Teacher: But you limit the amount of farm land you could have. Now, we have one generalization that was given to us by Shannon--there's more industrial economy going on in Japan than in India. Could we make a generalization for both agriculture and industry in Japan and India? You'll have to use some of these ideas we have up here. Tricia, do you have one already?

Tricia: Um, there's more agriculture in India than there is in Japan.

Teacher: Now, can you get the industry worked into that generalization too?

Tricia: (No reply)

Teacher: Do you want to think on it for awhile, or do you prefer some help?

Tricia: I'll have some help.

Teacher: Do you want to call on someone to help you?

Tricia: Matthew.

Matthew: Well, in both agriculture and industry, they are both--Japan is a lot more advanced than India in both of them.

Teacher: How does that fit you, Tricia?

Tricia: (Nods)

Teacher: What about you, Jim? Is that about the same thing as you had in mind?

Jim: Yes.

Teacher: Lange, you had a different generalization now?

Lange: Well, India doesn't use the land as well and some more of it is taken up with farming so there isn't as much area to use for industrial purposes.

Interpretation of Data Typescript

Teacher: Now, how does that fit in with what Mark gave us? Shall we make two separate generalizations or one?

Lange: Well, ah, it's different from Mark's, but about the same thing.

Teacher: OK, that makes two, is that what you're saying?

Lange: Yeah.

Teacher: OK. So, let's have Matthew's and then we'll take yours, Lange. Can you give that to us again, Matthew?

Matthew: Japan is more advanced in both agriculture and industry than India.

Teacher: And Lange, are you ready to give us yours?

Lange: Ah, India uses more of the land for farming, so it has less for industrial purposes, so it isn't as advanced in industry.

Teacher: Now, let's move on to religion and customs...did I cut you two off?

Lange: Well, I, don't think--I think India has enough land, it's just that it doesn't have the money for industries.

Teacher: And this is one of the reasons....

Lange: ...and the education.

Teacher: It's not as advanced as Japan? Betsy, what were you saying--Barbara?

Barbara: Well, Japan can, um, import ah, raw materials and then can put them out as manufactured, because they, ah, they would have to do that because they--because of the lack of good farm land; and India, all it has is farm land and, ah, a lot of natural resources. It doesn't have the money, or the ah, it's sort of a backwards country--kind of.

Lange: It doesn't have the skilled labor for industry.

Teacher: Do the two statements fit in with what we have up here or did you want to add something?

Barbara: No.

Teacher: Now, let's direct our attention to religion and customs. What do you notice there? Kathy?

Interpretation of Data Typescript

Kathy: Well, both, ah, India and Japan worship, ah, Buddha; they have a lot of Buddism.

Teacher: Christy?

Christy: Well, ah, in, some Moslems in India, they wear the, ah, the baggy material to cover their face so that no one but family men won't see their faces.

Teacher: Why do they do that, do you suppose?

(No reply)

Teacher: How would you account for their not wanting anyone except the family men to see their faces?

(No reply)

Teacher: Mark, do you have an idea on that?

Mark: I don't think it's them, I think it's their husbands--they don't want any other men to see them. They're worried about their wives.

Teacher: That may be. All right, some other ideas? Lange?

Lange: Well, Buddhism originated in India, but it--and then it moved into Japan and kind of, but then it died out in India. There's still some left, but it, ah, partially died out.

Teacher: But it had its start in India?

Lange: It started in India.

Teacher: Jim?

Jim: Um, in Japan they've got about one main religion and in India they've got two, Christiani--Christia--Christianity and Buddhism.

Teacher: Matthew?

Matthew: Well, in Japan, religion and customs are a lot more important than they are in India.

Teacher: Why do you say that?

Matthew: Well,...in Japan, if you would ah, well, you could be killed if you went against one of their, ah, religions--or it used to be, but I don't know if it still is now, and if you wear shoes into their homes, you can, you know, ah, they'll never let you in their hous-homes again and all kinds of things like that. And ah, so it's more important to them than in India, because in India, religion is very important, but there aren't too many customs that are important.

Interpretation of Data Typescript

Teacher: Now, I'm not sure I'm straight on what you're saying to us. Are you saying that religion is more important in Japan than it is in India? Or are you combining religion and customs?

Matthew: I'm combining religion and customs to say it's--religion and customs together is more important in Japan than it is in India.

Teacher: Any other ideas on that? Ron, do you have one?

Ron: Well, on the customs in India, the mother, when the daughter gets married, she passes all of her jewelry down to the daughter.

Teacher: I'd like to clear up on this one Matthew was on. Does anyone have something to say on Matthew's about customs and religion being more important in Japan than they are in India? Tricia?

Tricia: Well, I think that religion in, um India and Japan are both very important.

Teacher: Barbara, what was yours?

Barbara: I would say the same because India, um, one of the customs, ah, religion is the sacredness of the cows. And in India, I mean Japan, they have some more things like this--ah, like you could get punished very severely if you killed a cow.

Teacher: So both are important in both countries?

Barbara: Yes.

Teacher: Betsy?

Betsy: Well, I agree because, um, of the sacred cows and also, ah, pork--the pigs are kind of sacred too and they can't eat it. And then in Japan, they have, ah, many rules and if you go against them, you'll be in bad with the government.

Teacher: All right, coming back to yours, Matthew. The reason I asked some of the others' opinions was, I wonder if we have enough up here to make the generalization that religions and customs are more important in Japan?

Matthew: I don't think there's quite enough, because I think there's a lot more to it than just what things are up there. Because they have a lot more religions and a lot more customs, and, ah, I imagine India has a lot more religions and customs too.

Teacher: Do you know in your own background whether your first statement is true?

Interpretation of Data Typescript

Matthew: Well, I--ah, religion in both countries is real important, but customs in India aren't quite as important as customs in Japan.

Teacher: Now, how could we make this into a generalization? We started one.

Matthew: Customs are more important in Japan than they are in India.

Teacher: Just limiting to customs then?

Matthew: Yeah.

Teacher: OK. ...does someone have a generalization that would apply to both religion and customs in both countries? Lange, let's back up then, what were you going to tell us?

Lange: Well, awhile back, both Japan and India, their children had their lives, ah, they got so they, ah, couldn't do anything else, and the parents, ah, parents and the grandparents of the child, if ah, when it usually was very young, ah, decided what he would do and then in India they had to follow the thing...ah, the occupation of the caste they were in.

Teacher: Now, are you putting out a similarity of the influence of the family?

Lange: A similarity--they can't, ah, the children can't choose what they're going to do.

Teacher: Someone have a generalization yet? Barbara?

Barbara: I think that religion and customs in both countries are very important, because of the sacred cows and, ah, customs in Japan, and the cows in India. And then in customs, Japan, ah, still keeps most of its customs like it had many years ago. And in India, the girls have their husbands chosen for them, and....

Teacher: Now, let's move on to government and relations with others. Can all of you see that? What do you notice about government and relations with others? Mark?

Mark: Well, both of them are democratic, with the people electing the government.

Teacher: Something else, someone? Ron?

Ron: In Japan, men and women over 20 are eligible to vote.

Teacher: Would that go along with this?

Ron: Yeah.

Interpretation of Data Typescript

Teacher: Matthew?

Matthew: And in Japan's history, they wouldn't let anyone have any trade with them, but now they've open--ah, they've shut their door and they wouldn't let anyone in to trade.

Lange: You mean they were isolated.

Matthew: Yes, they became a hermit nation, but now they've, ah, since the U.S. defeated them they've become--they've had more trade and, ah, they're trading with almost all of the countries.

Lange: I don't think it's since the United States defeated them. It's because they prepared themselves and they had built up a large army and navy for both World Wars and how could they have done this if they had not had relations, because Japan doesn't have very much natural resources.

Matthew: Well, they, ah, they just didn't have too much trade--they had some but not very much, not enough to really make--not enough to make....

Students: ...they started before...(two boys talking at once)

Teacher: What were you going to say, Mark?

Mark: Well, I was going to say the United States didn't defeat them, they just scared them.

Teacher: Ah, looking at government and relations with others, what can you say about both countries in regard to both of these topics? Betsy?

Betsy: Well, I was going to say something about Lange's statement. How would they get these things for war? Well, they--once a year, ah, the Dutch could send out a ship and that was the only thing that they had.

Teacher: OK.

Lange: Could that be battle ships?

Teacher: All right, Lange, let's save that for a little later. Jim?

Jim: Well, India's got living more like the United States, and Japan's not quite like it.

Teacher: All right. Anything you could say about relations with others that would be the same or different for both countries. Tricia?

Tricia: Ah, both Japan and India send people to other countries to learn more for their country.

Interpretation of Data Typescript

Teacher: Now, let's see if we can look at all of these topics that we have up here and make a generalization that would cover agriculture, industry, religion, customs, government and relations with others for both countries. Perhaps you can make use of these generalizations we have up here on the board--fit them altogether. ...want to make a try at it, Lange?

Lange: Um...

Teacher: Not ready?

Lange: Not yet.

Teacher: Let's hear what you're thinking, Mark?

Mark: Well, they're pretty much the same except in agriculture and industry.

Teacher: Now, what do you mean by that, Mark?

Mark: Well, Japan is ahead of India in agriculture and industry but in the rest of them, they're pretty much the same.

Teacher: And how do you account for the fact that they are pretty much the same, basically?

Mark: Almost--they both have certain customs and their religions, and the same products, government and their relations are about the same.

Teacher: And how do you suppose they happen to get many of the same customs in government and relations?

Mark: I don't know.

Teacher: Can someone build on Mark's idea? Jim, what were you going to say?

Jim: Well, I was going to say that, ah, customs are about the same--and they've got the same kind of religion.

Teacher: All right. Let's see if we can build on that as to why they might have these similarities. Lange?

Lange: Well, they were both, ah, rather isolated because India was, ah, many little states and, ah, mostly under British rule and so they couldn't develop very much and Japan was isolated, and so it was, ah, they're about the same.

Teacher: Going back in history, their histories are somewhat the same. Now, can you bring it up a little more up-to-date? Mark?

Interpretation of Data Typescript

Mark: Well, they both had rulers. ...and when they became a separate--when they were isolated, so they were both primitive until just recently, and both of them are sort of coming-becoming more modern.

Teacher: And why are they becoming more modern?

Mark: Because they discovered other--the way of other countries.

Teacher: Barbara? What were you going to say?

Barbara: That was what I was going to say.

Teacher: Contact with other countries?

Barbara: Um hum.

Teacher: Lange?

Lange: Well, ah, Buddhism traveled and it probably, ah, was carried by people and...and people from India would probably carry their customs and so Buddhism spread to Japan so that the people--so they brought their customs to Japan.

Teacher: All right, let's see if we can put what Mark and Barbara have said here and the rest of you, in one--basically we said that they are somewhat alike, why? Mark, what was your statement?

Mark: From their histories.

Teacher: And Jim, what were you going to add?

Jim: (No reply)

Teacher: Did you have something to add, Jim?

Jim: I was going to say....

Teacher: And you said they were--what, Mark?

Mark: Because they came in contact with other--ah, with the rest of the world. They were helped along by our Navy.

INTERPRETATION OF DATA
OBSERVATION GUIDE

Teacher ____________________

Observer ____________________

Grade and Subject __________

I. Open-Memory Question ____

____

Tally

Check

_____Directed toward one dimension of the data

_____Directed toward several dimensions

Student Response

_____Read specific points from the data

_____Compared or contrasted

_____Generalized

____

None (Pupil Participation) 100 Percent

II. Focusing-Memory Question(s) ________________________________

____

____

Tally

Check

_____Directed toward a response elicited from an open question

_____Directed toward teacher initiated focus

Student Response

_____Referred to specific points from the data

_____Compared or contrasted

_____Generalized

Teacher Behavior

_____Called for refocus

_____Asked for substantiation

____

None (Pupil Participation) 100 Percent

Interpretation of Data Observation Guide

III. Interpretation Question(s) ______________________________

____

____

Tally

Teacher Behavior

_____Asked for clarification

_____Asked for substantiation

_____Helped students recall information not on display

_____Supported a student

_____Supplied information

_____Provided personal opinion

_____Refocused discussion

Student Response

_____Sought clarification from classmates

_____Sought clarification from teacher

_____Challenged validity of a statement

_____Supplied substantiating information

_____Utilized data from sources not displayed

____

None (Pupil Participation) 100 Percent

IV. Inclusive-Interpretation Question ______________________________

____

Tally

Teacher Behavior

_____Elicited more than one generalization

_____Led students to combine several generalizations into one

_____Asked for substantiation

Student Response

_____Referred to specific points from the data

_____Related two or more specific points

_____Generalized without supporting evidence

_____Generalized with supporting evidence

_____Modified or added to another generalization

Interpretation of Data
Observation Guide

V. Following observation, indicate whether:

__________Data sufficient for observation

__________Data visible to all students

__________Data legible

__________Data easily understood

__________Students aware of the process involved and the purpose

__________Teacher-pupil interaction predominated

__________Pupil-pupil interaction predominated

__________Pupils operated autonomously

Cite evidence of autonomous thinking:

____

____

____

What did you learn from this observation about the thought processes of the students involved?

INTERPRETING AN INFORMATION DISPLAY
LABORATORY EXPERIENCE

Content:	Participants are assigned in teams to teach the thinking process, interpretation of data. One member teaches, the other(s) observe and record data. Following the lesson the teaching member is provided with objective feedback on the events of the lesson.
Leadership Materials:	Interpreting An Information Display, Leadership Notes
Participant Materials:	Interpretation of Data Observation Guide Illustrative Models of Generalizations Suggestions for Primary Teachers
Rationale:	To provide intellectual and emotional experiences which insure accommodation of skills to personal teaching style To develop skills in obtaining and utilizing systematic and objective data
Objective:	After teaching a lesson based on cognitive processes, with observation providing systematic and objective feedback, each participant will demonstrate the accommodation of the process to his teaching style by utilizing it in future teaching activities.

It must be pointed out again that the laboratory experience component of the training program creates participant anxiety. The thought of teaching a new skill under observation, with feedback on one's behavior is at least initially threatening to most participants. However, to reemphasize a very important point, the laboratory experience is considered to be the one most significant factor in creating teacher competency with the thinking processes. Remember too, that despite the threat, participants, almost without exception, experience success and demonstrate a growing comfort with working together in a team approach.

The directions below are designed to provide suggestions for implementation within all three of the alternate instructional formats:

I. Workshop
II. Extension Course
III. Methods Course

Sequence	Time	Group	Activity
A			Preinstructional Planning 1. See the specific instructions in the section, Preinstructional Arrangements, pages 29-34.)
B	15	SG	Assignment of Laboratory Experience 1. Announce specific assignments: Time Location Team Members

Sequence Time Group Activity

One may save time and confusion by using a previously developed assignment sheet to have assignments ready for distribution.

2. Refer to the Interpretation of Data Observation Guide.

3. Discuss Data-Colllection Roles

   a. In the case of both the workshop format and the extension course format, one participant teaches and the other observes and takes data using the observation guide as the instrument for collecting specific data. In the case of microteaching, two participants take data.

   b. Caution participants to avoid value judgments in data collection. Attempt to collect valid, objective and specific evidence of behavior.

      Not: "Many pupils responded."

      Instead: "19 out of 20 pupils responded."

   c. Review the observation guide and discuss any questions or concerns.

4. Review Critique Procedure

   a. Following each teaching session, team members will confer. Utilizing the observation guide, the observer(s) will give feedback to the teacher concerning the events of the lesson.

Sequence Time Group Activity

b. AVOID VALUE JUDGMENTS
Don't tell a teacher that it was a "good" lesson, or a "bad" lesson. Tell him what happened and let him judge for himself. The critique session should be a joint inquiry into the data with an analysis of cause and effect relationships.

5. Advise participants to do the following:

a. Be at the classroom assigned a few minutes in advance.

b. Confer briefly with the classroom teacher. Invite him to observe if he likes, but if he does not wish to remain in the room, determine where he can be found in case the class finishes before the period is over.

C 60-90 SG Plan Laboratory Experience

1. In all three of the instructional formats, time must be provided for the teams to work together and develop an appropriate laboratory experience.

2. The ideal situation exists when it is possible for each team to develop strategies which are consistent with the curriculum being taught in that room.

Sequence	Time	Group	Activity
			3. However, in many (perhaps most) situations, the above will not be possible. Therefore, provide time for the team members to work together to plan a strategy with which they are most comfortable. At this point, refer to the material, Illustrative Models of Generalizations. Indicate that participants may wish to develop an information display using one of these examples as a guide. Also, point out that the information display which they have developed for their instructional unit may be appropriate for use.
			4. Require participants to develop a cognitive map of expectations, i.e., have them indicate in writing the anticipated responses for each question to be asked in the teaching strategy.
			5. Ask participants to check their cognitive map with a leader before leaving.

Interpreting An Information Display
Laboratory Experience

Sequence	Time	Group	Activity
D	60-180	Schools	Laboratory Experience 1. Participants will spend the appropriate period of time operating as teams in the teaching practicum. (This is a particularly good time for the instructional leaders to meet together for planning.)
E	30	SG	Reaction to Laboratory Experience 1. This is a very important session. Participants will be emotionally wrung out at this point, but still stimulated to talk about what happened. The session's greatest value is in just sharing experiences. Use the observation guide if it seems advisable in conducting the discussion, but allow time for participants to unload both ideas and feelings. 2. Do not expect to continue for an extended period of time during the day beyond this point. Participants will be far too emotionally exhausted to give full attention.

INTERPRETATION OF DATA
OBSERVATION GUIDE

Teacher ____________________

Observer ____________________

Grade and Subject __________

I. Open-Memory Question ____

____

Tally

Check	Student Response
_____Directed toward one dimension of the data	_____Read specific points from the data
_____Directed toward several dimensions	_____Compared or contrasted
	_____Generalized

____
None (Pupil Participation) 100 Percent

II. Focusing-Memory Question(s) ______________________________________

____

____

Tally

Check	Student Response
_____Directed toward a response elicited from an open question	_____Referred to specific points from the data
_____Directed toward teacher initiated focus	_____Compared or contrasted
	_____Generalized
	Teacher Behavior:
	_____Called for refocus
	_____Asked for substantiation

____
None (Pupil Participation) 100 Percent

Interpretation of Data
Observation Guide

III. Interpretation Question(s) ____

____

____

Tally

Teacher Behavior

_____Asked for clarification

_____Asked for substantiation

_____Helped students recall information not on display

_____Supported a student

_____Supplied information

_____Provided personal opinion

_____Refocused discussion

Student Response

_____Sought clarification from classmates

_____Sought clarification from teacher

_____Challenged validity of a statement

_____Supplied substantiating information

_____Utilized data from sources not displayed

____

None (Pupil Participation) 100 Percent

IV. Inclusive-Interpretation Question ________________________________

____

Tally

Teacher Behavior

_____Elicited more than one generalization

_____Led students to combine several generalizations into one

_____Asked for substantiation

Student Response

_____Referred to specific points from the data

_____Related two or more specific points

_____Generalized without supporting evidence

_____Generalized with supporting evidence

_____Modified or added to another generalization

Interpretation of Data
Observation Guide

V. Following observation, indicate whether:

__________Data sufficient for observation

__________Data visible to all students

__________Data legible

__________Data easily understood

__________Students aware of the process involved and the purpose

__________Teacher-pupil interaction predominated

__________Pupil-pupil interaction predominated

__________Pupils operated autonomously

Cite evidence of autonomous thinking:

____

____

____

What did you learn from this observation about the thought processes of the students involved?

ILLUSTRATIVE MODELS OF GENERALIZATIONS

1. Most members of a family usually have both responsibilities and privileges.

	Work	Fun
Mother		
Father		
Children		

2. As the size of a community changes, the services within the community often change.

	Policemen	Firemen	Etc.
Rural Area			
Suburban Area			
Urban Area			

Illustrative Models of Generalizations

3. The cultural patterns of the Colonies were largely determined by physical environment and cultural patterns brought from the Old World.

	Physical Conditions			Patterns of Living in the Old World					Patterns of Living in the New World				
	Climate	Topography	Natural Resources	Economy	Housing	Religion	Education	Government	Economy	Housing	Religion	Education	Government
New England Colonies													
Middle Colonies													
Southern Colonies													

Illustrative Models of Generalizations

4. Industry in an area is largely dependent upon the availability of raw materials, transportation and market.

	Industry	Raw Materials	Transportation	Market
Western Venezuela				
Orinoco Valley				
Santa Catarina, Brazil				

5. The Cold War is essentially the result of two conflicting points of view toward the postwar world, that of the United States and that of the Soviet Union.

	Political Values	Social Values	Economic Values	Relations With Others
United States				
Soviet Union				

Illustrative Models of Generalizations

6. Measures regarded as radical in one generation are often considered moderate in the next.

	Women's Rights	Racial Relations	Etc.
Eighteenth Century America			
Nineteenth Century America			
Twentieth Century America			

7. The novel often reflects the social issues of the time.

	Novel			Society	
	Plot	Setting	Theme	Political Issues	Social Issues
Colonial America ("Leather-stocking Tales")					
Victorian England ("Vanity Fair")					
Mid-Twentieth Century America ("Catcher in the Rye")					

Illustrative Models of Generalizations

8. The short story usually depicts life as a continuous struggle against a hostile world.

	Character Needs	Barriers To Needs	Solutions
Characters			
Plot			
Setting			
Theme			

9. The physical environment of an area largely determines the life forms in the area.

	Life Forms		Environment	
	Plants	Animals	Climate	Topography
Northern Alaska				
Oregon				
Arizona				

Illustrative Models of Generalizations

Examples of Completed Models

A Comparison of Some Animals and Their Environment

	Description			Environment	
	Coat	Legs	Ears	Climate	Topography
Polar Bear	White, Thick	Short, Thick	Short	Cold	Flat
Jack Rabbit	Brown, Short	Long, Thin	Long	Warm	Flat
Deer	Brown, Fairly Thick	Long, Thin	Long	Cool to warm	Hilly
Mountain Goat	White, Thick	Fairly Long, Thick	Short	Cool to cold	Steep

	CULTURE			PHYSICAL ENVIRONMENT	
TRIBE	FOOD	CLOTHING	SHELTER	LAND	CLIMATE
Indians of the Plains	Buffalo meat, dried and fresh Some wild vegetables, sweet potatoes, turnips, squash, beans, corn Birds, antelope, rabbits, wolves	Made of buffalo skins, deer, bear, caribou hide Feathers Decorated with beads Women tanned the hides and made the clothes	Homes of skins were called tepees Made of poles stuck in ground covered with hides of buffalo Painted picture stories on skins One family in each tepee	Flat lands, some rolling hills Land is grassy Herds of buffalo roam the plains There are a few mountains along the edge	Annual rainfall is 15-30 inches Cold winter Hot summer
Indians of the Northwest Coast	Whale boiled in boxes Other seafood: mussels, starfish, clams, salmon, deer, rabbits Got food with spears, nets, traps Picked wild berries in the woods	Clothes made of shredded cedar bark Animal skins used in winter Babies wrapped in blankets made of goat wool mixed with cedar bark	Houses of cedar bark Split logs, some over 50 feet long No windows or chimney Many families in each house	Next to the sea Many cedar trees Rough land Many streams, rivers and quiet pools	Very much rain, some places 100 inches Mild winter Storms and fog in winter Warm temperatures
Indians of the Desert	Many vegetables, chili beans, corn, squash, pumpkin Meat: sheep, goats, deer, turkey, birds Fruits like melons Nuts, berries, some insects	Wool used for clothes and blankets Women wear blanket dresses Leather moccasins	Houses of clay and sand baked hard in the sun No doors, trapdoor in the roof Four or five stories high Slept on skins	Hard and dry Poor vegetation Few mountains Sharp cliffs Poor soil, except near water	Hot and dry Little rain No winter
Indians of the Forest	Forest animals: deer, bear, porcupine, fox Wild berries Wild turkey, ducks and eggs of these Fish from the streams Cooked with hot stones	Made of deer hide Moccasins have leaf designs, flowers and birds Feather headdresses	Houses made of elm, bark, grass, birch bark Longhouse used for eating by the whole tribe Wigwam for sleeping; each family had warm blankets, houses were round	Many trees Trails led through the woods Streams, some lakes Rolling hills	Plenty of rain Snow in the winter Sunny summers

TWO IMAGINARY COLONIES OF PEOPLE

	Nationality of settlers	Description of location where colonists settled	Fifty years later
COLONY I	English	Forests Temperate climate Fine agricultural land Water for power Few mineral resources Landlocked	The same political party had been in power for forty years. All the schools taught exactly the same subjects, used the same texts. The same schoolboard members were elected over and over. There had been no strikes.
COLONY II	English German Scotch-Irish Swiss	Forests Temperate climate Poor farm land Water for power Coal, iron Seaport	Several different political parties had been in power. Both public and private schools were functioning. People argued about the best texts. Schoolboard members were constantly being replaced. There had been great unrest among labor including strikes and riots.

Illustrative Models of Generalizations

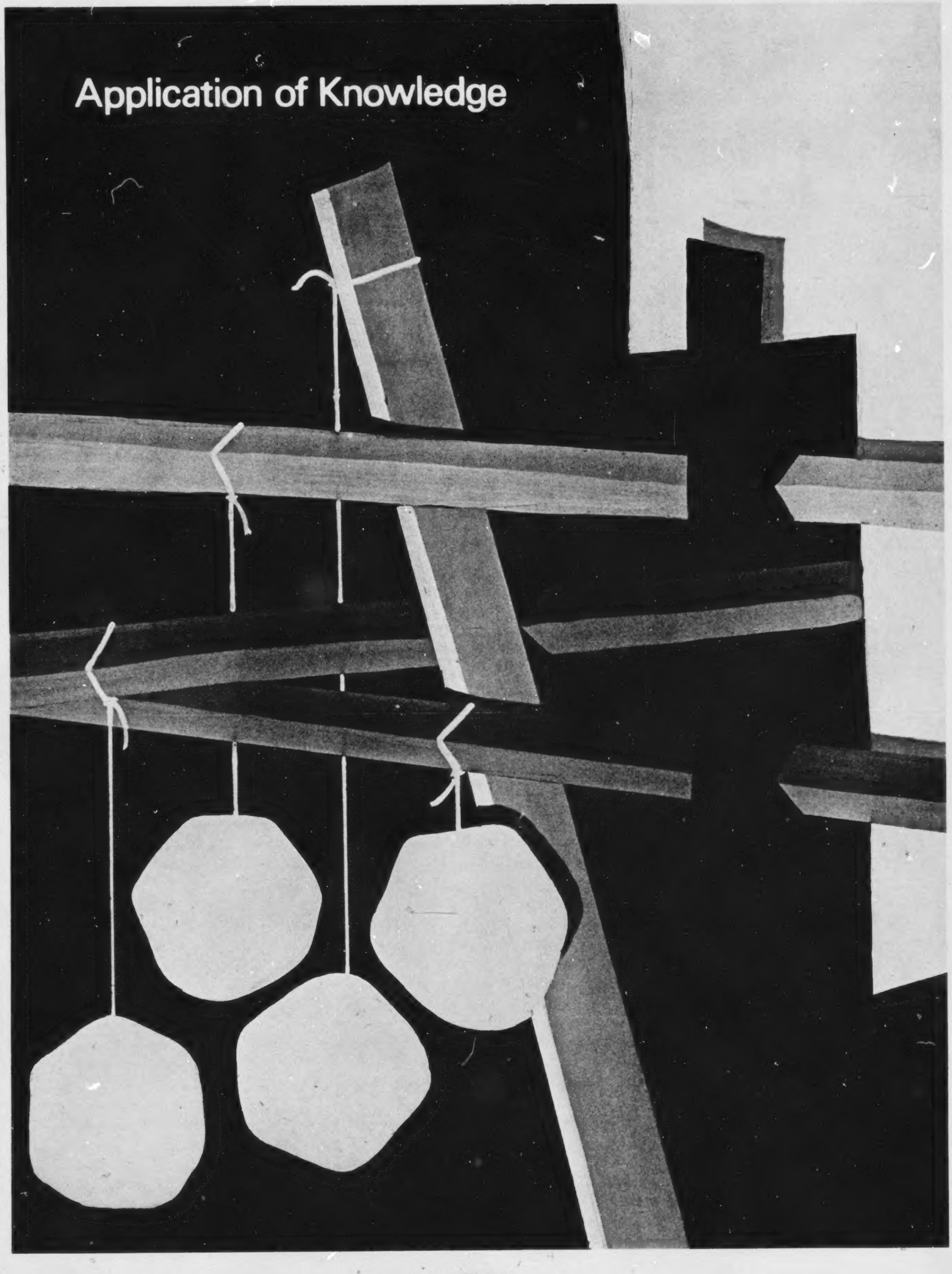
	FUN	WORK
PIONEERS	Spelling Bees Taffy Pull Riding Horses Hunting Fishing Skating Games	Hunting Fishing Trapping Farm Work Farm Chores Household Chores
TODAY	Television Movies Team Sports Riding Horses Hunting Fishing Snow Skiing Water Skiing Skating Games	Babysitting Paper Routes Yard Work Household Chores

SUGGESTIONS FOR PRIMARY TEACHERS

Teachers who plan to conduct their laboratory experience for interpreting an information display at the primary level may wish to construct the display in pictorial form. The following displays have been used with success:

1. Pictures by the "Dairy Council" which illustrate life in the city and life on a farm.
2. Pictures of animals from various parts of the world
3. Pictures of houses from various parts of the world
4. Pictures of different farms and types of transportation
5. A simple illustrative model which compares and contrasts two cultures, with the dimensions filled in with drawn or cutout pictures.

Application of Knowledge



SENSITIVITY TO APPLICATION OF KNOWLEDGE

Content:	Participants will be sensitized to the process of application of knowledge by assuming the roles of the students as the instructor guides them through the process.
Leadership Materials:	Sensitivity to Application of Knowledge, Leadership Notes
Participant Materials:	An Information Display A Fact Sheet on Iraq [TO BE DISTRIBUTED]
Rationale:	To provide a sensitivity experience to the intellectual and emotional processes involved in the application of knowledge
Objective:	When performing the prescribed exercises, participants will become completely involved in the process of application of learning as demonstrated by their responding during the sensitivity experience and their subsequent understanding of the process.

This experience is designed to sensitize participants to the process by asking them to apply the knowledge gained during a study of Japan and India to a new situation: Iraq. The study of Japan and India led to the generalization: "Civilizations change when they encounter a different culture. The changes may vary in degree." Iraq has encountered a number of different cultures throughout its history and, in recent years, has had much contact with Western nations interested in its oil reserves. For this reason, it is used as a basis for the application of knowledge task.

Sequence	Time	Group	Activity
A	45	SG	Application of Knowledge 1. Refer to Information Display and map in Participant Materials. 2. Inform participants that this exercise is an application to a new situation of the learning gained during the study of the Japan and India unit. (Do not identify the subject country.) Indicate that only the data for the column Relations with Others is complete to the present day. The data for religion, agriculture, industry, customs and government does not cover the past 50 years.

Sequence **Time** **Group** **Activity**

3. Allow participants time to read data on the chart and map.

4. Conduct the following question sequence:

   a. "What would you expect to find if you went to visit this country today?" Record responses. Responses are often similar to those following.

   Industry

   Highly skilled hand labor

   Small earrings, mosaics, rugs, shawls

   More and more export trade

   Increase in technology and mechanization, electronic equipment

   Tourism one of the leading industries because of closeness to Europe

   An exotic land, has mosques

   Agriculture

   Money would pull people from the farms to the cities

   Irrigation, fertilizer, power-driven Jeeps, caterpillar tractors, plows, mechanized agriculture

   Country of contrasts, areas of isolation, other areas of great agrarian reform

   Not developed to the extent of exporting agricultural products.

Sensitivity to Application of Knowledge

Sequence	Time	Group	Activity
			No pork raised due to religious prohibition
			Government
			Militarily weak
			Pawn of world powers
			Rich have gotten richer
			Poor have remained static
			Two extremes, no middle class
			Oil companies have had a great deal of influence, more skilled workers
			Children educated in oil company schools
			The older a country becomes, the harder it is for it to change
			Customs
			The rural areas keep the old customs and the cities pick up more Western customs
			Old Customs:
			Manner of dress, veils
			Herd sheep and goats, rural habitat
			Camels and horses for travel
			New Customs:
			Travel by truck
			One wife
			Skilled workers, city dwellers

Western dres

Political foundation changed from isolation to one of world outlook

Skilled workers have cars

Religion

Have retained religion

Have maintained political control through religion

Some Christians and Jews

b. "Let's look more closely at your predictions for agriculture in this country. Why would you expect it to be this way?"

c. "If the farming is done in this way, what effect will it have?" Chain may be built at this time by extending and relating ideas. For example:

mechanized agriculture ---→ fewer farm workers needed ---→ migration to city ---→ large labor force for oil industry

"If fewer farm workers are needed, what will be the consequences?"

"What will this migration of farm workers to the city mean?"

d. Repeat the process of focusing as in b above and of interpreting as in c above for each of the following: religion, customs, industry, government.

e. After a number of interrelationships have been developed among the topics, ask: "Based upon the predictions we've given, what generalization can be made about this country?"

Sequence	Time	Group	Activity
			5. As a verification process, proceed with the following: a. What country is this? (If participants do not know, display a world wall map and let them ascertain the country.) b. How can we verify our predictions? c. To control the access to information on this problem, A Fact Sheet on Iraq was collected earlier when the participant package was originally distributed. It is now time to redistribute it to them. Allow time for the group to verify or refute their predictions from the data provided. d. Reconvene the group. Discuss validity of their predictions.
B	30	SG	Analysis of Process 1. After the sensitivity experience, conduct a discussion based upon the following questions: a. "How did you feel while going through this process? Why?" b. "What intellectual operations were required?" *Recalling* *Hypothesizing or Predicting* *Perceiving Relationships* *Substantiating and Generalizing* c. "What previously learned knowledge did you bring to bear on the problem posed?"

Sequence	Time	Group	Activity
			2. Discuss questions which arise, and indicate that subsequent activities will provide more detail regarding the process.

AN INFORMATION DISPLAY

Relations With Others

Written history dates back as far as 3,000 B.C.

After about 500 B.C. other nations of the Near East dominated the area.

In 1638 the country was conquered by the Ottoman Turks.

From World War I to 1932, Britain controlled the country.

In 1932, it became an independent nation.

In 1951, western petroleum companies signed an agreement giving the government half the profits from oil produced within the country.

Government

This country has one of the longest histories of any country in the world.

After Mohammed, it was ruled by Caliphs who acted as spiritual and civil leaders. From the 1500's to 1924, it was dominated by the Ottoman (Turkish) caliphate.

Agriculture

Sheep, camels and horses were raised. The animals were used for food, transportation, clothing and trade.

Farmers used hand tools and wooden plows. Many dates and a great deal of barley were grown.

Customs

Many people spent their lives as wandering herdsmen, herding sheep, goats, camels and other livestock.

Leaders of the tribesmen sometimes had great wealth and power.

Houses of the people who did not wander were flat-roofed and made of sun-dried mud brick.

The men wore long white shirts reaching to the ankles. Women's clothing consisted of long, woolen cloaks and sometimes veils over their faces.

Religion

At first these people worshipped nature and idols. Their chief gods were Allah, Uzza and Manot.

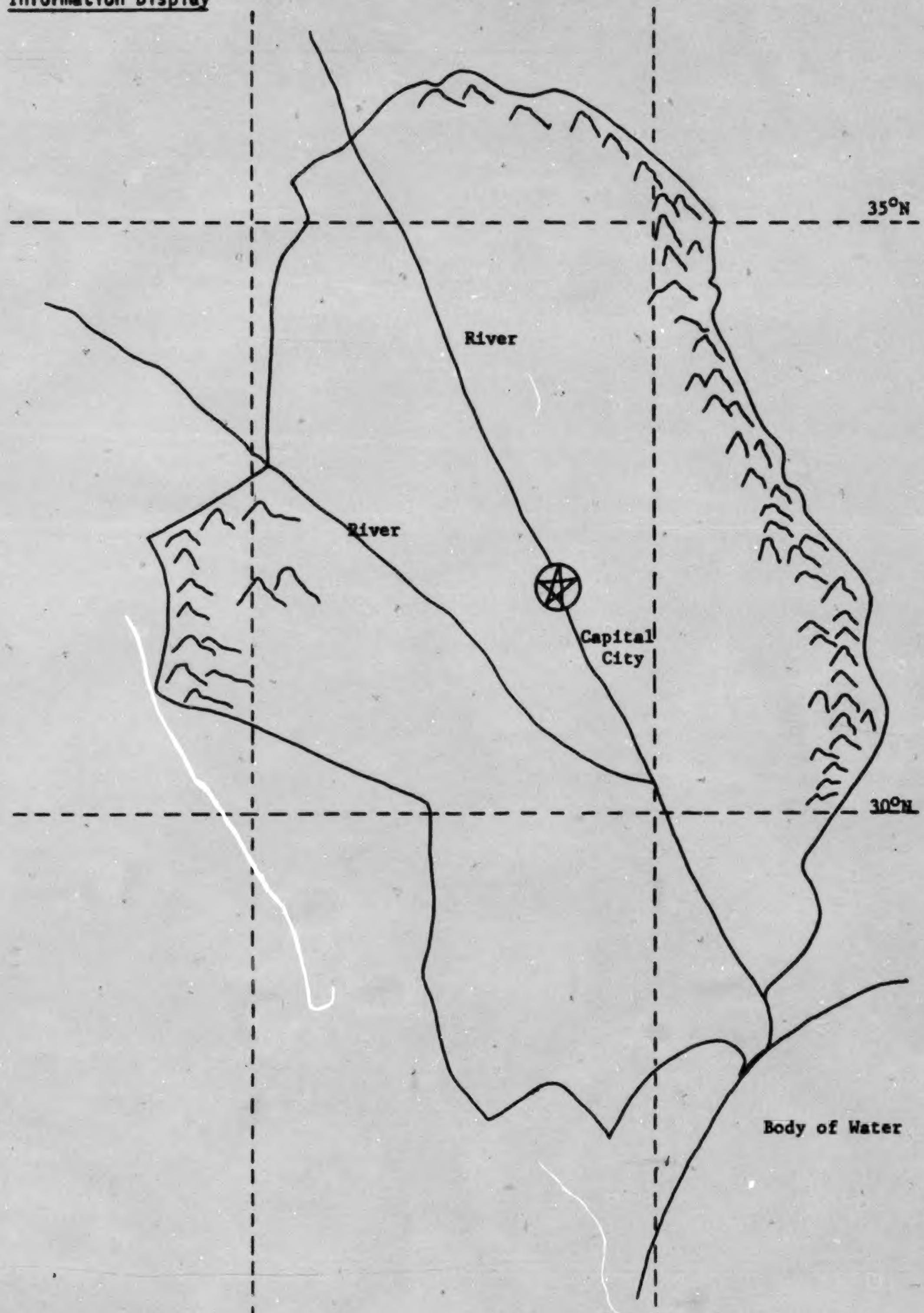
Mohammed became convinced that there was only one God and that he revealed himself in the Bible. Mohammed said that God called him as his prophet to destroy idolatry and to bring the people to the worship of one God. He preached the punishment of unbelievers and gathered an army to force others to accept his beliefs.

Followers of this religion became known as Moslems. They honored learning and developed arts. Academies and universities were established. Elements of other cultures were adopted by the Moslems as part of their religion.

Industry

Craftsmen produced fine jewelry, glassware and textiles. Glazed tiles painted with intricate designs were used for mosques, their houses of worship.

Information Display



A FACT SHEET ON IRAQ[1]

Location. This land of the *Arabian Nights* lies on a dry, sandy plain between the Tigris and Euphrates rivers. Iraq is slightly larger than California, (but has only about half as many people). Farmers grow dates, barley and other crops on fertile green farm land near the rivers. *Sheiks* (tribal chiefs) and their tribesmen live in tents on the yellow sand dunes and gray limestone hills of Iraq's western desert. These desert Arabs raise camels and spirited Arabian horses. In northern Iraq, rugged Kurdish herdsmen tend flocks of sheep and goats on the slopes of the Zagros Mountains.

Population. The people of Iraq are called Iraqis. Most of them live near the Tigris and Euphrates rivers. About 80 of every 100 Iraqis are Arabs. The Kurds, who live in mountainous Kurdistan, are the second largest group of Iraqis.

Way of Life. More than 5 of every 100 persons in Iraq spend their lives as wandering tribesmen, roaming the mountains and desert with herds of sheep, goats, camels and other livestock. The sheiks, who lead the tribesmen, sometimes have great wealth and power.

The rest of the people make their homes on small farms, in villages or in cities. They usually live in flat-roofed houses made of sun-dried mud brick. Baghdad and other cities have some modern houses and buildings.

Some of the people wear American-style clothing. But most of the men wear long white shirts that reach to the ankles. The women's clothing includes long woolen cloaks. A few Moslem women wear veils that cover their faces. Rice, bread, dates, mutton and beef are among the chief foods. The people enjoy *kebab*, or meat roasted on a skewer. Most of them drink tea and thick Turkish coffee.

Iraqis are fond of racing pure-blooded Arabian horses. Hunting for small game is another favorite sport.

Profits from Iraq's great petroleum industry have made many changes in the people's way of life in recent years. Many desert tribesmen have settled in the villages and on farms, and have learned to use new agricultural machinery and methods. Irrigation projects have turned much wasteland into fertile farms.

Agriculture. About 50 of every 100 persons in Iraq earn their living from agriculture. The desert and mountain tribes raise sheep, camels and horses. They use the animals for food, transportation, clothing and trading. Almost all Iraq's farms lie near the Tigris and Euphrates rivers. Most farmers still use primitive equipment, including hand tools and wooden plows. But the government has introduced some modern farm machinery and farming methods. Southern Iraq grows about four-fifths of the world's dates, but barley is the major crop. Barley is grown in all parts of Iraq, mostly for local use. Other crops grown in Iraq include wheat, tobacco, rice, millet, cotton and grapes.

---

[1] Adapted from The World Book Encyclopedia. © 1971 Field Enterprises Educational Corporation.

Mining. Iraq ranks high among the petroleum-producing countries of the world. Large-scale oil production began in 1927. Today, oil wells gush in many parts of the country. Pipelines carry petroleum to the Mediterranean ports of Baniyas, Syria and Tripoli, Lebanon.

The oil fields and pipelines are operated by three corporations owned by petroleum companies of several other countries. The corporations give the Iraq government half of the profits from the petroleum they produce in Iraq. A government-owned plant built in 1955 near Baghdad refines petroleum products for domestic use.

Manufacturing. Iraq has no large-scale manufacturing. Products made for local use include textiles, flour, building materials, cigarettes and leather goods.

Trade. Petroleum is Iraq's biggest export. Other exports include packaged dates, grain, wool, cotton and animal hides. Great Britain is Iraq's best customer. Iraq imports textiles, sugar, coffee, tea, iron and steel, machinery, timber, artificial silk and chemicals. Most of Iraq's imports come from Great Britain and the United States.

Education. Iraq's public schools are free, and the law requires children between the ages of 6 and 12 to attend. About 84 of every 100 persons cannot read or write. The Government has improved the educational facilities of the country by building many new schools and increasing the number of teachers. Baghdad, Basra and Mosul have government-operated universities.

Religion. Most of the people are Moslems. The country also has small groups of Christians, Jews and persons of other faiths. Iraq has complete religious freedom.

PROCESSES IN APPLICATION OF KNOWLEDGE

Content:	This knowledge base presentation gives the theory, purpose and teaching strategies involved in the application of knowledge.
Leadership Materials:	Processes in Application of Knowledge, Leadership Notes
Participant Materials:	Processes in Application of Knowledge
Rationale:	To develop an understanding of the theory and teaching techniques for use in subsequent activities
Objective:	Following a formal presentation on the theory, purpose and teaching strategies of application of knowledge, participants will be engaged in activities requiring them to demonstrate their understanding of such knowledge by the completion of specified tasks.

The purpose of this presentation is to provide a knowledge base for the subsequent simulation and laboratory experiences. It may be conducted in one of two ways.

I. Illustrated Lecture

II. Reading of Processes in the Application of Knowledge.

Sequence	Time	Group	Activity
I	20	LG	Illustrated Lecture Leaders who possess sufficient background in the theory and teaching strategies of application of knowledge may wish to develop their own presentation. Information has been provided in the reading which should aid in preparing in the presentation.
II	20	LG	Reading of Processes in the Application of Knowledge Ask participants to read the paper provided on the processes involved in the application of knowledge.

PROCESSES IN APPLICATION OF KNOWLEDGE

In a world changing so rapidly that half of the jobs today's first graders will fill have not yet been created, the individual is repeatedly forced to transfer what he has learned in one setting to a newly emerged or radically modified situation. If he cannot do so, he is apt to find himself among the unemployed and malcontent of society.

It is for this reason that the instructional program presented is not complete when students have acquired the skills of obtaining factual data, analyzing it for relationships and, from these relationships, abstracting generalizations or inferences. A step beyond is needed to prepare the learner for the challenge of adapting himself to his ever-changing world. That step, the *application of knowledge*, when properly done, is faithful to its title. It consists of applying previously acquired knowledge and skills to new situations--a transfer of learning.

Occurring at the end of a unit or the end of a sequence within a unit, the application of knowledge task serves to evaluate teaching because it assesses the carry-over of what has been taught, to a new or unfamiliar situation. For students, the task provides insight into the purposes of the unit study, confirms that the study was indeed purposeful and, thereby, that thinking is essential to the achievement of worthwhile goals. Frequently, a by-product of the task is the development of the attitude that thinking is fun.

Application of knowledge is of two types: conjectural and practical. Conjectural application connotes a degree of imaginative creativity as in, "What would happen if water came to the desert?" Practical application suggests a mundane process to many, as for example, "Now we've learned where to place commas. Take this paragraph and insert commas where needed."

Processes in Application of Knowledge

Tasks of application, though practical, should invoke some degree of creativity within them. "We've studied punctuation, especially commas. Now let's see if you can use them correctly when writing your articles for the school newspaper." The two types of application, conjectural and practical, shade into one another, very often combining elements of both.

For example, pupils have studied the relationship between standard of living and use of natural resources. As an application task, students were given a hypothetical country with data concerning natural resources, land forms, climate and existing standard of living. They were to determine what could be done to raise the standard of living. Certainly the problem allowed for creative thinking and it was a practical problem to explore in today's world.

Within the application of knowledge process are four basic steps. A summary of these steps follows.

The first of these is exploration. Students are called upon to interpret the data provided within the task, to bring to bear upon this data previously acquired knowledge and insights and to develop on the basis of the data some predictions, inferences or hypotheses which may be extended and related. An open-application question which allows a number of divergent responses should be posed.

A unit on the development of civilization has resulted in students generalizing that there are certain basic steps, usually occurring in sequential order, in the development of a civilization. For the application of knowledge task, the students were provided data concerning an aborigine group and were asked to predict what would likely happen within this group from that point on.

Processes in Application of Knowledge

After completing a study of budgeting, students were presented with a budget for a family of five with an income of $7,200 per annum. The question was, "If the family's income were reduced to $5,600, what adjustments would you make in the family's budget?"

Following a study of nutrition which focused on the school hot lunch program, students were assigned, as an application of knowledge task, the responsibility of planning a week's menu which met the criteria of good nutrition, attractiveness, standards governing school lunches and remained within the cafeteria budget.

The second step, focusing-application required students to focus upon specific responses elicited in the initial question and to supply enough supporting evidence to justify their inclusion as logical predictions, inferences or hypotheses. The focusing-application question may be:

> Why do you think one of the first things they would do is to make arrowheads?
>
> You said you would decrease the amount of every item in the budget by 10 percent. What is your reason for this?
>
> Let's look at the menu for Wednesday. Where is the protein requirement?

Extending an idea and perceiving interrelationships are the two basic mental processes of step three, relating-analysis. The relating-analysis question is usually designed to elicit consequences, effects or the relating of items, as in the following:

> If this primitive group used the available flint for arrowheads, what effect would this have on their way of life?
>
> What would be the consequences of deleting that portion of the budget set aside for investments?
>
> We've listed cheese sandwiches on the same menu as creamed chicken. Let's look at this in relation to our criteria for attractiveness, good nutrition, expense and hot lunch standards. (This question is actually an evaluative question.)

Processes in Application of Knowledge

Step four, inclusive-interpretation, is not appropriate for every task. For summarizing or drawing conclusions, students are required to pull together the many hypotheses, inferences or predictions into one or more succinct statements as called for in the following questions:

> Based upon our predictions thus far for this group, what can you say about these people in general?
>
> After working with the problem of constructing a budget for a reduced income, what conclusions have you drawn?
>
> What can you say about menu planning now?

To provide a means other than teacher opinion for evaluating student success in an application of knowledge task, it is well to design a task which allows for verifying. Referring back to the first example of the steps in the development of a civilization, if an actual society which has progressed through the steps of development is used as the basis for the task, then the society can be identified after the application of knowledge process is completed. Students, then, may verify their predictions and at the same time accumulate more knowledge about the topic.

The application of knowledge task may be viewed as embodying the processes of:

1. Exploring for a number of divergent ideas
2. Focusing upon specific ideas for the purpose of substantiating them prior to extending and developing interrelationships
3. Summarizing or drawing conclusions
4. Verifying, where possible, the predictions, inferences or hypotheses developed

As with the other two processes, concept diagnosis and interpretation of data, the application of knowledge process begins with an open question. The open question is utilized to permit as many students as possible to respond with as many different ideas as possible. The students, in essence, are asked to explore their minds for a wide range of ideas. All ideas are solicited. Unless no relevancy to the question is discernible, supporting evidence is not sought at this stage of the process.

Because the purpose is to elicit many divergent responses, it is also easy to elicit responses unrelated to the problem. Refocus by saying, "What was our problem?" This matter of relevancy may become somewhat of a problem for the teacher. Unless he has previously mapped possible responses which the question may elicit, he may find it difficult to determine whether certain responses are relevant or irrelevant. For this reason, it is recommended that the teacher explore responses which may be anticipated. Remember, if the teacher is practiced at making good inferences, predictions and hypotheses, he is much more apt to be successful in teaching the process to his students.

It is essential to the process that all students, as well as the teacher, understand what is meant by a response. If the meaning of a response is not clear as indicated by the teacher's own inability to grasp it or the puzzled looks on other students' faces, ask the student to restate it using different terminology, to give an example of what he means, or to provide additional details. Examples of clarifying questions are:

What do you mean by primitive farming methods?

I'm not sure what you mean. Can you state it in another way?

How would you make the letter more "interesting"?

Don't overlook the possibility of another student being able to paraphrase for his classmate. Encourage such supportive action by fellow members with, "Does someone think he knows what Joe is trying to say? Joe, would you like Debbie to help you?"

Processes in Application of Knowledge

Many students, like some after-dinner speakers, ramble here, there and everywhere while attempting to make a point, only to lose their listeners along the way. To help these students gain the skill of clearly and concisely communicating and to enable the listeners to grasp the import of the discourse, say to the student, "That was a long statement. Could you put it in one sentence?" Allow thinking time. If he's experiencing difficulty rephrasing his idea, offer him the choice of taking more time to think or selecting a class member to help him. If he elects to solve the problem himself, be sure you do not forget to come back to him. Nothing hurts worse than to labor for naught. If he is forgotten, it may be the last time that student will voluntarily contribute to a class discussion. Leave a blank space on the board to remind you to call on Johnny when he appears ready or write his name in the corner of the board. A school year of such effort almost invariably results in enough improvement that parents are aware of their child's improved communication skills.

In the application of knowledge task the teacher should have in mind the range of ideas which can be expected with the open question. If certain dimensions are missing that he feels the students are aware of but have not expressed, ask, "What else would you expect to find?" or "Are there any other things we could do as leaders?" Areas which are not mentioned during this mapping of the field probably indicate that students have not had enough encounters in these areas to recognize them as relevant to the question. The teacher has discovered a useful cue that provision needs to be made in another unit of study to incorporate encounters in these omitted areas.

Throughout this program acceptance of student responses has been stressed. Why? Because participating students are more likely to be thinking students than are the nonparticipators. Everyone has had the experience of being cut off or having his ideas flatly rejected because they didn't coincide with the instructor's. Result? Usually it was the last time the student voluntarily contributed. Accepting an idea, then asking for supporting evidence gives the contributor the autonomy of deciding the merit of his idea and keeps the focus on the idea as to whether it is worthwhile, not on the contributor. The goal should be for the student to feel secure enough that he can say, "No, that idea of mine really doesn't fit."

Not all ideas expressed will be of equal merit. During the focusing-application step those ideas having the most "mileage" in them can be ascertained and brought to the attention of the group. If Sammy has some logical idea for developing the water power of the country, then the idea is worth extending. But, suppose that when Sammy was asked, "How would you develop the water power of this country?" he could not offer any methods, nor could any of his classmates. Perhaps, in reality, the country had few water resources to develop. It would be teaching a misconception for the teacher to extend the idea of developing water power when there is none to develop. To pursue this point just a bit further, one may ask, "Why would someone mention the idea when there was no basis for it?" For an answer, look at the initiating question.

> You are the leader of this country (indicate contrived map) with natural resources and geographical features shown. Rainfall is 40 inches per year. Literacy rate is 57 percent and the average annual income is $580. What would you do as leader?

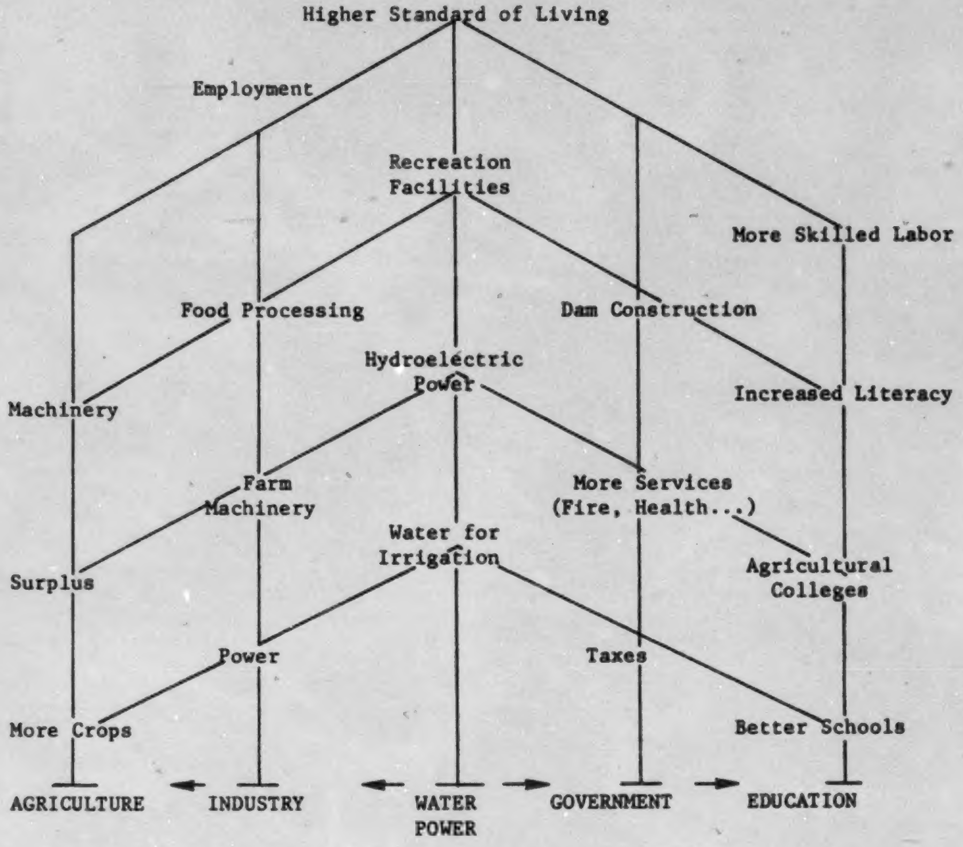
The implication is that as leader one would want to raise the standard of living. To most students in the United States, particularly in the Pacific Northwest, a basic method of raising the standard of living is to develop water resources for hydroelectric power, irrigation, urban supplies, recreation and many industrial processes. Actually, the student is transferring knowledge from one situation to another. But, this may be a time when he learns that a new situation requires modifying ideas to fit the new setting.

In the relating-analysis step, the effects of developing water can be extended and related as illustrated on the cognitive map on the next page. Students, and teachers, often are intrigued by the number of interrelationships which can be developed during interpretation. The process is further enhanced when responses are graphically portrayed as illustrated by the cognitive map. Question strategy should proceed step by step, cued to pupil responses as: "If they used primitive methods of agriculture, what would be the result?" "And what would be the effect of having few surplus farm products?" At any point within the chain where the contributor does not provide a basis for the inclusion of a specific link, ask for substantiation. "Why would more teachers lead to more engineers and doctors?"

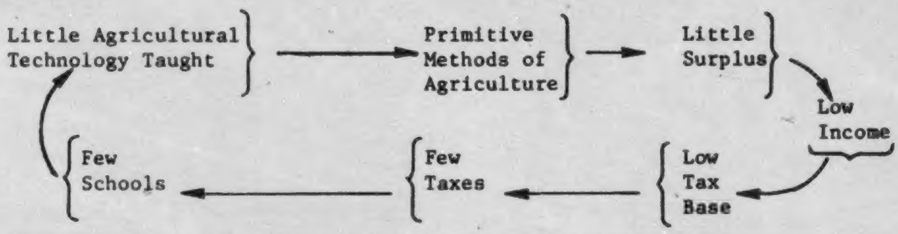
The effective impact of visually representing an extended idea cannot be overemphasized. The student or students involved in developing an extended idea feel a very real sense of accomplishment when they can see the idea emerging visually as well as verbally. Other members of the group actually see the development of an idea and its extension. In the practical application task, such chain diagrams are seldom useful. The end product, however, is frequently visually presented, as in the case of the letter or the menu planning mentioned previously.

Processes in Application of Knowledge

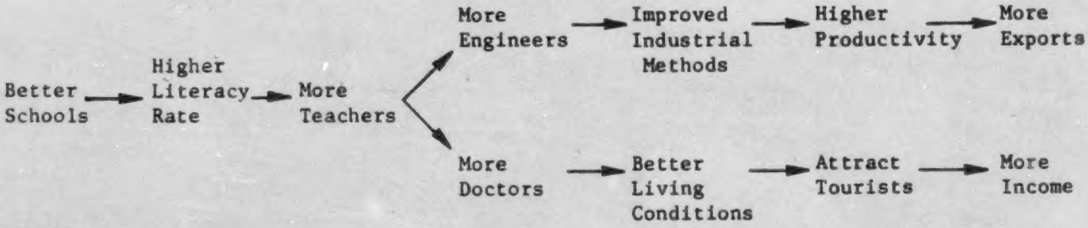
COGNITIVE MAP



CYCLE CHAIN


Little Agricultural Technology Taught
Primitive Methods of Agriculture
Little Surplus
Low Income
Low Tax Base
Few Taxes
Few Schools

MULTIPLE CHAIN



Processes in Application of Knowledge

Obviously, in a conjectural application of knowledge, the process of adding dimensions, extending and interrelating could go on and on. When the time allotted for the activity is spent, or the teacher discerns that students are waning in their productivity, it is time to bring the episode to a close. An inclusive-interpretation question such as, "Based upon the predictions we've given, what generalizations can be made about this country?" serves to summarize the discussion and to reemphasize the generalization which pervaded the entire instructional unit. Keep in mind, however, that not all application of knowledge tasks lend themselves to a generalization. Some may simply end with the completion of the relative-analysis step.

Many practical application of knowledge tasks may involve little or no formal questioning strategy by the teacher. Rather, the questions may be asked by the students of themselves when confronted with an individual task. For example, after an interpretation of data wherein students have examined the methods of scientists and arrived at a generalization about scientific process, they might be assigned, as an application of knowledge, to conduct an experiment using the scientific method. The student very likely would ask himself, "With this experiment to perform, what can I do?" *(open question)* After exploring possibilities, he would *focus*, "What will be the first step?" When he has made the decision of what to do first and substantiated it to his satisfaction, he would begin to *relate*, "If I do this, what effect will it have?" After a series of *relating-analysis* questions, he would arrive at the *inclusive-interpretation* question, "What will be the result of my actions?" This question would be answered by the outcome of the experiment.

Processes in Application of Knowledge

Experience has shown that an application of knowledge task with the opportunity for students to verify the validity of their responses leads to an awareness of the learning process. This arrangement also provides additional data for each individual about his degree of success in this particular learning episode. In addition, he acquires more factual data about the situation involved in the application task. A verifiable problem provides the teacher a more objective evaluation than does a situation wherein his personal opinion is the only basis of the evaluation.

During the process of applying knowledge to a new situation, students frequently express curiosity as to whether the problem deals with a real or mythical situation. For a true test of application of knowledge, it is preferable that the identity of the problem not be disclosed. This keeps the focus on the application of knowledge. Otherwise, students begin guessing rather than reasoning, and those students who do recognize the identity of the problem merely recall what they know. Just one student familiar with the problem situation may stifle participation by the others because they feel handicapped by a lack of specific factual data.

When the inclusive-interpretation question has been answered, the teacher may ask, "Do you know of a situation similar to this?" If students can readily identify it by recall, or pointing on a map, acknowledge the identity. If necessary, simply inform them as to the identity. Proceed with, "How could we check our solutions (predictions)?" When students have found accessible sources of verification, allow sufficient time for them to locate the pertinent information. Supply sources of data and help in locating materials as needed. The purpose of this activity is for the students to find information to verify or refute their proposed solutions, not to gain practice in research skills. Students at this step are impatient to check the wisdom of their decisions and are apt to cause the librarian great consternation or great delight, depending upon whether she views the library as a haven for books or a haven for learning. After the students have gathered sufficient data, reconvene the group. "What did you find?" is sufficient to elicit such responses as:

> Most of our ideas were right, but they haven't developed farming as much as we thought.
>
> We left out mining and textile manufacturing.

A generalized reaction to their own performance may be elicited by, "How do you feel about the quality of our thinking today?" Individuals frequently comment about their own performance with "I didn't contribute much today," or "I did better than last time."

Students can be self-assessing because verification has given them a means of "keeping score" on the accuracy of their thinking. But, most important, they finish this final step of the process with some confidence that they can do more with their minds than merely ingest, memorize and repeat. They see that skillful application of what they do know can give them a measure of control over what they don't know, and in the world they inhabit, that means a great deal.

The following outline is designed to serve as a guide for planning the application of knowledge strategies.

Processes

Types of Application of Knowledge

Conjectural: Requires predictions, hypotheses and inferences. A situation allowing for verification or predictions, hypotheses and inferences is selected when possible.

> What would happen if water came to the desert area?

Processes in Application of Knowledge

Practical: Direct application of knowledge of skills.

Correctly punctuate your stories.

Steps in Application

Open-Application: Open question calling for divergent ideas.

What is likely to happen to this country in the future?

How would you make the area more productive?

What menus would you plan that would be well-balanced and cost no more than 35 cents per serving?

Focusing-Application: Substantiation of specific ideas.

Why do you think one of the first things they would do is make arrowheads?

Why would you decrease each item in the budget by 10 percent?

Where is the protein requirement?

Relating-Analysis: Extending ideas and perceiving relationships.

What effect would this have?

What would be the consequences?

Inclusive-Interpretation: Concluding or generalizing.

What can we say in general about our predictions for the future of this country?

Verifying: Checking predictions, hypotheses and inferences for validity.

Let's check our research materials to see if these things actually have happened.

Processes in Application of Knowledge

Teaching Strategies

The purpose of the application of knowledge task is to provide students with an opportunity to apply what has been learned in one situation to another. The task may be either conjectural or practical.

Exploration

The initial step in the application of learning is to obtain a number of divergent ideas which can be extended and related to each other. These ideas are elicited by means of an open-application question.

> Students have been given the history of Iraq up to 1900 and information relating to Iraq's oil deposits and contracts with Western oil companies.
>
> What would you expect to find if you went to visit this country today?
>
> After studying the relationship between use of natural resources and standard of living, students are asked:
>
> You are the leader of this country (indicate contrived map) with natural resources and geographic features as shown. Rainfall is 40 inches per year. Literacy rate is 57 percent and the average annual income is $580. What would you do as leader?
>
> We've decided to express our appreciation to Dr. Jones for talking to us about the skeletal system Wednesday by writing letters. What do we need to do to write a letter which will be worth Dr. Jones taking the time to read?

Five basic discussion skills have been identified.

> Refocusing: Because the purpose is to elicit many divergent responses, it is also easy to elicit responses unrelated, or distantly related, to the problem. Refocus by, "What was our problem?"
>
> Clarifying: If it is not clear what the student is attempting to say, ask him to provide an example, to restate it in another way, or to provide more information.
>
>> What do you mean by primitive farming methods?
>>
>> I'm not sure we know what you mean. Can you state it another way?
>>
>> How would you make the letter "interesting"?

Processes in Application of Knowledge

Summarizing: Responses which have become long and involved need to be summarized.

That was a long statement. Could you put it into one sentence?

Mapping field: If the opening question has not elicited as many ideas as desired, pull for more by:

What else would you expect to find?

Are there any other things you would do as leader?

What else does a letter of appreciation need?

Acceptance: In general, all responses are accepted. During the focusing process, ask the student to support his idea with substantiating evidence. If the response appears totally unrelated, ask for substantiation immediately.

Focusing and Substantiation

This aspect of application of knowledge is designed to focus on certain responses which can be extended for profitable learnings.

Let's look more closely at your predictions for agriculture.

Why would you expect it to be this way?

Development of water power was mentioned. How would you develop the water power of this country?

You said that we would want to tell Dr. Jones that we learned something from his talk. What might you tell him you had learned?

The primary discussion skill is substantiation.

Interpretation

The primary purpose of the interpretive process is to extend ideas and to lead pupils to perceive interrelationships.

If the farming is done in this way, what effect will it have?

What consequences would building a dam on this stream have?

Jim said he wanted Dr. Jones to know that he learned how the skeletal system and the muscles are related. How might he state this in his letter?

Visual representation of an interrelationship by means of a map or chain diagram is an aid to learning.

Processes in Application of Knowledge

Summarizing

Summarizing is pulling together the inferences, predictions and generalizations which have been expressed during the application of knowledge task.

> Based upon the predictions we've given, what generalizations can be made about this country?
>
> We've said that we would develop water power, open up mines, encourage tourism, etc. What would be the result of doing these things?

Not all application of knowledge tasks lend themselves to a summarizing or concluding step.

Verification

Whenever possible, tasks should be selected which are potentially verifiable. The teaching strategy involves allowing time to research pertinent data, then as a group evaluating the predictions or inferences made in relation to the evidence gathered.

EXERCISES IN APPLICATION OF KNOWLEDGE

Content:	This series of three exercises is designed to develop skill in the process of application of knowledge.
Leadership Materials:	Exercises in Application of Knowledge, Leadership Notes
Participant Materials:	Analysis of Opening Questions Discussion Techniques Second Grade Example For Application of Knowledge
Rationale:	To make participants aware of the strategies involved in the process of the application of knowledge task
Objective:	Upon completion of the exercise, participants will possess sufficient understanding of and skill in the processes of application of knowledge to gather objective data during the demonstration and to perform successfully in the laboratory experience.

EXERCISES IN APPLICATION OF KNOWLEDGE

The following activities are designed to develop additional understanding of, and skill in:

1. Opening questions for the task of applying knowledge
2. Discussion skills needed for successfully conducting the strategy

Sequence	Time	Group	Activity
A	45	SG	Analyzing Opening Questions

1. Refer to the exercise on Analysis of Opening Questions.
2. Divide into three subgroups and assign questions as indicated on the exercise.
3. Present the following directions:
   a. "Consider each question in relation to what you would expect to obtain as responses from students."
   b. "You may designate whatever grade level you wish for each question."
4. After approximately 10 minutes, ask participants to consider the second question if they have not already done so.
5. After approximately 10 minutes more, ask groups to reconvene as the total small group.

Exercises in Application of Knowledge

Sequence	Time	Group	Activity
			6. Focus the attention of the total group on the first question of Group I. Ask that the members indicate what they would expect to obtain as responses to that question. Repeat for each of the other questions on the exercise. 7. For final discussion, ask, "What criteria would you suggest for determining a good opening question for application of knowledge?" List answers on board. *Must have knowledge base* *Open enough to allow all children to respond* *Broad enough for diversity of ideas* *Clear, definable terminology* *Within realm of reality*
B	15	SG	Discussion Techniques 1. Refer to the exercise on Discussion Techniques. 2. Ask participants to read and respond to the directions as individuals. 3. After approximately three to five minutes, ask participants to check their perceptions with a neighbor.

Sequence	Time	Group	Activity
			4. After approximately three to five minutes more, reconvene small group and share reactions. *Teacher "A" asks for substantiation and extension of ideas:* *Focusing: "Why do you say this?"* *Interpreting: "And what would this mean?" "In what ways would this make a change?"* *Teacher "B" keeps discussion on fact level and editorializes students' comments.*
C	5	SG	Application of Knowledge - Second Grade 1. Refer to the sheet entitled Second Grade Example for Application of Knowledge. 2. Indicate that although this is an example of the process conducted in a second grade classroom, it is illustrative of one way of applying the process at any grade level. 3. Allow time for participants to read the exercise.
D	90	Indiv. or SG	Constructing an Application of Knowledge Task for Instructional Unit 1. With the accomplishment of this task, participants have completed their

Exercises in Application of Knowledge

Sequence	Time	Group	Activity
			instructional unit. Ask participants to design and develop a learning experience which requires application of the knowledge learned during the study of the instructional unit. After deciding upon a task for application of knowledge, participants are to devise a questioning strategy and diagram the sequence of student responses which they predict.
E	30	SG	Evaluation of Application of Knowledge Task 1. Select two volunteers from different grade levels to present their application tasks, question sequences and diagrams. 2. Discuss task as a valid application of knowledge learned during study of instructional unit. Ascertain whether verification is possible. 3. Consider the questioning strategy and diagram in relation to: a. Is the questioning strategy likely to result in many divergent responses? b. Will the questioning strategy serve to develop interrelationships? c. Is the diagram consistent with the questioning strategy?

ANALYSIS OF OPENING QUESTIONS

Group I

What would happen if gold were discovered near our town?

What would happen if girls could enter school a year earlier than boys?

Group II

What would happen if all the transportation into our community were closed for six months?

What would happen to a man if he discovered the secret of living forever?

Group III

What would happen to the gross national product if taxes were doubled?

What would happen in our state if the prevailing winds blew in the opposite direction?

DISCUSSION TECHNIQUES

NOTE: The following two teachers have each asked approximately the same question, "What would happen if the desert nomads could get all the water they could use?" What differences do you notice in the teachers' questions/comments?

Teacher A

11. They wouldn't be traveling any more. They would just stay to get the water.

T. Why do you say this?

11. Because they usually travel to get the water.

1. There would be more grass for sheep and cattle to eat.

T. And what would this mean?

1. That they wouldn't have to move around to get food for them.

3. Well, they would probably have more food because the rain would come down on the gardens and produce more food. When they could have flowers there, and they could plant seeds for trees, and the rain would make the trees grow, and then they could have wood.

T. And this means....

3. And this means wood for houses and stuff.

67. If they had water, they could probably change some of their clothing.

T. In what ways would this make a change?

67. They wear woolen clothes for their shape and things. With water, they might get their clothes all wet, and they might want to get something shorter.

T. Any other changes that would come to a desert-like country if it could have water...all the water that it needed?

Teacher B

16. They'd be using one house and they'd stay in one place.

T. All right. They'd stay in one place and they might make their houses with mud.

18. They wouldn't have to move so much.

T. Why, 18?

18. Because they'd have enough grass.

T. Right, to feed their animals.

13. They'd make crops.

T. What kind of crops do you think they'd grow?

13. Things that need sun and don't need too much water.

T. But suppose there was lots of water?

18. Well, things that need sun need lots of water.

T. What kind of things would that be?

18. Carrots.

T. Carrots, maybe.

63. They could grow their own barley.

T. They could grow their own barley and not have to go out to the bazaar to buy it.

SECOND GRADE EXAMPLE FOR APPLICATION OF KNOWLEDGE

This second grade class has studied "homes" in three distinct climate areas: arctic lands, hot, dry lands and their own temperate environment.

Generalizations stated by the pupils as a result of interpreting their information display were:

1. The people in hot, dry countries are nomads and their tents protect them from the hot sun and there isn't enough wood to build wooden houses.
2. People build houses to fill their needs.
3. People make houses for the kinds of weather they have.

Following the interpretation process, the teacher conducted the following application of knowledge activity.

T: We've been talking about houses and we had fun yesterday putting what we learned in sentences. (She read the above generalizations on the board.) So we've studied houses in hot, dry and cold countries; and in temperate countries like our own.

Today we're going to see a filmstrip about another country that we've never seen before. Look at it very carefully. We'll try to find out what kind of weather they have and what grows there.

After we see that country, we'll pretend that we live there, that we've always lived there, we've never been any place else. Then, we'll draw a house that we might live in if we lived there.

Look carefully at the weather and the kinds of things in this country. (Filmstrip shown, "Rain Forest," talked about frames which illustrate flora, fauna, topography and climate.)

Now for just a minute, just think about what you saw, and think of all the things that we've been learning. Then draw a house you'd live in there.

I see some of you are thinking about it. That's what we should always do, isn't it?

(Pupils begin drawing, approximately 15 minutes spent in this activity.)

I know many of you haven't finished yet but let's put down our crayons and pencils and show each other our houses and tell why we drew them.

Second Grade Example for Application of Knowledge

(Children show their pictures, describe the materials they used and tell why.)

Examples

Tree house, vine rope ladder, limbs and brush

Brush hut

Grass hut

Palm leaf hut

Hut made from mud, dirt, bark (So hot and wet that flowers grow on the mud roof.)

House made of wood and leaves

House on stilts ("It rains a lot and sometimes there would be a flood.")

House of sticks and grass ("Just holes for windows because they have no glass.")

DEMONSTRATION OF APPLICATION OF KNOWLEDGE

Content:	A typescript, live demonstration or videotaped demonstration is used to illustrate the processes in application of knowledge.
Leadership Materials:	Demonstration of Application of Knowledge, Leadership Notes
Participant Materials:	Application of Knowledge Typescript Application of Knowledge Observation Guide Cognitive Map of Anticipated Responses [To be CONSTRUCTED AND DUPLICATED BY DEMONSTRATOR, see Leadership Notes.]
Rationale:	To provide greater insight and skill in the processes of application of knowledge
Objective:	Observation of the demonstration will result in participants having a better understanding of the processes involved in application of knowledge as indicated by their data gathered, reaction to demonstration and their performance during the laboratory experience.

The purpose of the demonstration is to illustrate, in a classroom setting, the specific processes involved. A live demonstration should be conducted by an individual highly skilled in the processes. However, the activity may be conducted using one of the alternative techniques below.

I. Typescript

II. Live Demonstration

III. Videotaped Demonstration

I. The typescript can be read in advance and allows questions to be predesigned to focus attention on specific elements of the process.

II. A live demonstration conducted by a skilled leader, though its results may not be as predictable, elicits more personal involvement of participants in the analysis of the process.

III. A local videotaped demonstration conducted by a skilled leader, while not eliciting the degree of personal involvement as a live demonstration, has the advantage of showing students and teacher in action while at the same time permitting a review of selected parts of the demonstration. In addition, the leader can preview the tape and design questions to emphasize salient points of the process.

Demonstration of Application of Knowledge

Sequence	Time	Group	Activity
A	20	LG	Planning of Demonstration

I. Typescript

1. Read the typescript and determine specific points to which you wish to call attention to in the reaction discussion.

II. Live Demonstration

1. Arrange for the use of classroom(s) for demonstration(s). If participants represent several grade levels and/or subject matter areas, and if time and personnel permit, it is suggested that several simultaneous demonstrations be given.
2. It may be advisable to send a letter, or to visit the cooperating teacher of the demonstration class in advance to insure a normal classroom situation. (See the sample letter in the Preinstructional Arrangements, page 36.)
3. Arrange for appropriate seating for observers.

III. Videotaped Demonstration

View tape in advance. Determine strategies to be emphasized. Be sure

Demonstration of Application of Knowledge

Sequence	Time	Group	Activity
			tape has audible sound and a clear picture so participants can follow the application of knowledge process.
B	20	SG	Predemonstration Discussion 1. Refer to the Application of Knowledge Observation Guide. a. Go over the guide carefully to insure that participants understand what they are looking for. The data they collect will be utilized in the reaction discussion. Indicate specifically the importance of concentrating on the process and not on the management of students. 2. Give clear directions as to time and place if live demonstrations are being conducted. Ask participants to be a few minutes early to avoid stragglers.
C	40	SG	Demonstration I. Typescript 1. Read typescript with participants assigned to take data utilizing the observation guide.

Demonstration of Application of Knowledge

Sequence	Time	Group	Activity

II. Live Demonstration or Videotaped Demonstration

1. Use any application of knowledge task that is comfortable for you. If possible, use the same group of students which were involved in the demonstration of concept diagnosis and interpretation of data.

   The following questions have been used with success:

   If you are your family were going to a "primitive" area to live (describe area) what would you need to take with you?

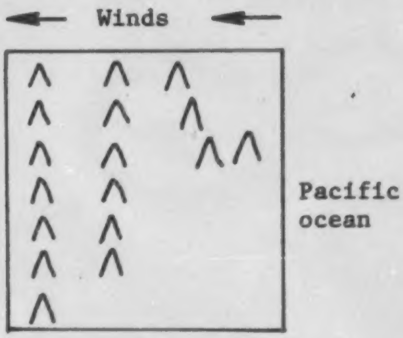
   What would happen if all of the food that a person needed was reduced to just one pill a day?

   What would happen if the American school system decided to follow the practice of training only the best students?

   What would happen if the topographical features of (Oregon) remained the same, but the Pacific ocean was on the east side of the state, and the prevailing winds were from east to west?

Demonstration of Application of Knowledge

Sequence Time Group Activity



If the same group of students is used which was involved in a demonstration using the Japan-India Information Display, or if a particular group of students is available who has had previous background study of countries in the Middle East, the material on Iraq which was used for the sensitivity experience may be utilized for this demonstration. Also, if the grade level is appropriate, it is suggested that a possible application of knowledge task which would be related to the Japan-India unit could be:

> What would happen if
> suddenly everyone in
> India could read and write?

Demonstration of Application of Knowledge

Sequence	Time	Group	Activity
			2. Prior to the demonstration, DEVELOP AND DUPLICATE A COGNITIVE MAP of the anticipated responses. Anticipated responses for the Iraq information display are listed in the leadership notes for Sensitivity to Application of Knowledge. *Do not distribute the cognitive map to participants until the reaction session following the demonstration.*
D	30	SG	Reaction to Demonstration There are three purposes for providing participants this opportunity to react to the demonstration: 1. To provide an opportunity to discuss what was observed and to relate it to their own teaching style and situation 2. To provide an opportunity for participants to gain insight into systematic and objective analysis of instruction 3. To provide an opportunity for participants to identify professionally and personally with others at their same grade level or subject area

Demonstration of Application of Knowledge

Sequence	Time	Group	Activity

Procedures

1. Divide participants into grade level and subject area groups, or into groups according to the level which they observed.
2. DISTRIBUTE YOUR COGNITIVE MAP and indicate that these were the responses which were anticipated. Discuss each of the points on the observation guide. Work for accurate and objective data when discussing why the anticipated responses were or were not obtained. When value judgments are offered, ask for supporting evidence. Stick to process. If possible, avoid discussion of management.
3. Regardless of whether or not the Iraq materials were used in the demonstration, show the Iraq information display and review the rationale and procedures for this type of verifiable application task.

Rationale: Direct transfer of learning

Verifiable predictions

Demonstration of Application of Knowledge

Sequence	Time	Group	Activity
			Procedures: Open-Application Question: Exploration of ideas Focusing-Application Question: Substantiation of ideas Relating-Analysis Question: Extending and interrelating ideas Inclusive-Interpretation Question: Summarizing, generalizing

APPLICATION OF KNOWLEDGE TYPESCRIPT

Teacher: In our last lesson, can anyone recall the generalization we made regarding Japan and India? Can you, Matthew?

Matthew: They were very much alike except in their agriculture and industry, in which Japan was ahead. The reason this was this way was because they both recently became acquainted with the new world.

Teacher: Ok, let's put that down then so we have it in front of us. They were both very much alike. What was the rest of it?

Matthew: Except in agriculture and industries.... Japan was ahead there...and the reason for that is because they had both been shut off from the new world, except for quite recently... and progress.

Teacher: And you had something on there about recently that's been happening.

Matthew: Well, the reason Japan is ahead is because India was under British, Britain, and Japan has had a longer time to, say, stop isolation and India hasn't had as long.

Teacher: Let's see if we can make that a little more concise. Matthew, do you remember just how you stated that part of it, it would make it progress, and what's the rest of it?

Matthew: Ah, they were making progress, oh, I don't quite remember.

Teacher: Can anyone help him out?

Teacher: What caused the change recently?...do you remember?

Matthew: Maybe the increase in trade, I think.

Teacher: All right. So we had these two countries that we had been studying that have come in contact with other parts of the world and the changes are coming about because of that. Now, up here we have another country that most of you are not familiar with, you have not studied, and we have some information on this country also, the relations with others is complete right up to the present time, but industry, agriculture, government, religion and customs are not complete. We get some of those from the past history. Our job now is to read that information and then do some predicting as to what you think this country would be like today. We'll take time right now to take a look at the map and read the chart.... Who has some ideas about what this country may be like today? Matthew.

Application of Knowledge Typescript

Matthew: Well, in agriculture, they probably have more different kinds of food are being grown now, and they probably have machines to help.

Teacher: What leads you to say that, Matthew?

Matthew: Well, because most countries do develop that way. They get machines and they start diversifying what they're growing and....

Teacher: And you feel there would be machines now?

Matthew: Yes, machines.

Teacher: Did you also say, different kinds of crops?

Matthew: Yah.

Teacher: Do you have any crops in mind that they might have added in recent times?

Matthew: Well, maybe some of the grains, like wheat, and things like that.

Teacher: Something else, Lange?

Lange: It looks like, ah, the lay of the map, it's isolated, except by mountains in the Northeast, and the North has mountains, and it only has a very tiny stretch of land on the sea.

Teacher: Would you expect it to be isolated yet today?

Lange: It's probably becoming less isolated but it wouldn't be easy, ah, to get around into it, except by airplane, unless there is some highway coming in from the Northwest or the South part.

Teacher: Something else? Barbara?

Barbara: I think that maybe the women don't wear veils over their faces now and they wear lighter clothing than before.

Teacher: That would be a custom then, you feel would have changed?

Barbara: Um hum.

Teacher: Why do you think they would be wearing veils and woolen clothing?

Barbara: Well the, ah, in order for them to have some of the crops. It would have to be a hot climate that comes over there, and the wool would keep them real hot, but with machines coming in and new modern methods, so there's times they don't wear veils anymore.

Application of Knowledge Typescript

Teacher: Now, you mentioned machines coming in and new modern methods. Machines in what, Barbara?

Barbara: In farming, and jobs in factories.

Teacher: This would be a part of the industry then. ...and you feel that factories here would be related to the clothing that they're wearing. They wouldn't have to wear wool. Christy, you had your hand up.

Christy: Well, it says that this country has a very long history.

Teacher: And what would that mean today?

Christy: Well, it might have, they might have had a lot of wars.

Teacher: Do you think they're engaged in war now?

Christy: They might be.

Teacher: Barbara?

Barbara: Well, I don't think right now they would have four wives.

Teacher: Do you think that's a custom that might change?

Barbara: Yes.

Teacher: Why, Barbara?

Barbara: Well, because, ah, some of them, lots of wives are an old custom, and they thought that the more wives they had, the richer they were, and now you just marry someone you love, and that's a wife.

Teacher: It's not a sign of wealth. How many wives do you think they'd have then?

Barbara: One.

Teacher: One wife. And, now, I won't put wives down. Just one wife. Another one, Lange?

Lange: Well, they probably aren't nomadic, they'd not have nomadic tribes anymore.

Teacher: Why don't you feel they'd have nomadic tribes?

Lange: I would think they would settle down.

Teacher: Why?

Application of Knowledge Typescript

Lange: Because it would be harder to, ah, to be living in nomadic tribes after it's settled down and becomes a country, and has armed services, etc.

Teacher: Could you carry it any further and give me other reasons why they might settle down in recent times?

Lange: Well, they wouldn't have as much chance if they decided to settle down later because the society would be too far ahead of them.

Teacher: Do you feel they would settle down so they could keep up with the rest of the society?

Lange: And also it would be very difficult to keep a nomadic tribe in the country.

Teacher: Any other ideas along that same vein? Do you have one, Shannon?

Shannon: Well, it says that they developed academies and universities, but they wouldn't be that far behind society if they had academies and universities.

Lange: This is the nomadic tribe, the wandering tribe. They wouldn't have mobile universities.

Teacher: One of the customs that you feel would have changed is that they would not be nomadic. They would have settled down.

Lange: Yes.

Teacher: And Shannon, where would we put yours, about the university? What does that mean to you today?

Shannon: Well, over there it's religion but it doesn't seem like a religion.

Teacher: What impact would that have on their life today, do you think?

Shannon: Well, they wouldn't be very far behind society, not in the real sense.

Teacher: Would you expect them to be on a level with the rest of the world, as far as education is concerned? Is this what you're saying?

Shannon: Yes.

Teacher: Can we put that with, relations with others?

Application of Knowledge Typescript

Lange: I don't think that it would be on a level because, ah, in 1932, it became an independent nation, and...ah, I don't think Britain would do very much to improve the educational facilities.

Teacher: What do you think, Shannon?

Shannon: Well, if they have academies and universities, they probably learn the same things as we learn here.

Teacher: Well, maybe we need to make something over here just called education. Are you saying they still have academies and universities?

Lange: They didn't say how many they had. They might have a whole bunch or just a few.

Teacher: All right, we can leave that then as to whether they compare to the rest of the world, and if you get an idea, Shannon, I can always put it down. Jim?

Jim: Well, their, ah, transportation isn't very good. They have animals, they use them for food, transportation. I don't think their transportation is up.

Teacher: Do you think they're still using those today?

Jim: Well, not as many, but they got a few cars maybe.

Teacher: Why wouldn't you expect them to have a lot of cars, Jim?

Jim: (No reply)

Teacher: Any ideas?

Jim: No.

Teacher: Ok, we'll move on then. Christy?

Christy: Well, in the agriculture it says that sheep, camels and horses were, ah, good...were raised, and probably used as, for plowing.

Teacher: Would you expect to find them plowing with animals yet, today?

Christy: No, they'd use tractors probably.

Teacher: Machines today.

Lange: Well, they would still be using a lot of animals because from 1932, they probably wouldn't be able to get an awful lot of machinery.

Application of Knowledge Typescript

Mark: Well, but....

Teacher: You're basing a good deal on this statement, up here?

Lange: Yes.

Teacher: And you would expect to find still, some animal power used. Is that it?

Lange: Some animals.

Mark: But it seems like Britain would help it along if it was....

Lange: Yes, it would, but not, it, it probably wouldn't help it along as much as if it was an independent country.

Teacher: Carl, what would you expect to find if you went to this country today?

Carl: I don't know.

Teacher: We'll let you think on it and we'll come back to you. Barbara?

Barbara: I think that, in a way, this country is like India. It still has a lot of its old customs, but it's beginning to get newer and modern things.

Teacher: You must have given that statement some thought. Why do you think it's a lot like India?

Barbara: Oh...I looked at the information that was up there on the board. I just looked through it, and was just thinking... that, I thought of another country that it could be, and I just sort of took if from there, and put it together.

Teacher: So you would expect customs to be much like India's?

Barbara: Un huh.

Teacher: Any other areas that we have or any that we don't have, that you would expect to be like India's, that we should put up here?

Shannon: Well the way it's developing from the old to the new. It's developing faster though, than India.

Teacher: You think it's developing faster. In which area?

Shannon: In, probably the religion,...because, because the neighbors speak Italian.

Application of Knowledge Typescript

Teacher: Religion...and when you say it's developing to the new, what would you have in mind in religion?

Shannon: Well, they still have real old ones, like they can't eat the _____, and ah, they could probably get more ahead....

Teacher: Any other things?

Shannon: Well, there probably is, but I don't know what they are.

Teacher: Ok...ah, going back to you, Barbara, any other specific areas in here that would be like India?

Barbara: The agriculture and _____the new machines...and better farming methods.

Kathy: Well, on religion, I think they probably, ah, the other gods, idols and stuff, and probably _____over a little bit, ah, ah, getting more modern and stuff, so they probably, all these other gods________.

Teacher: Another idea, Ron?

Ron: Well, they probably don't worship as many gods, cause just like, ah, Japan did, they had some gods and they just died out, and went to different countries.

Teacher: They went....

Ron: Yeah, the other countries worshipped.

Teacher: Betsy?

Betsy: Well, I don't think anymore that they would, ah, get armies and force the people to believe in one god. I think that they would just, ah, try to have them believe, and teach them, but if they didn't want to, they'd let them believe what they want.

Lange: It depends whether it's a communistic country, or a democratic country.

Betsy: I suppose so. Well, I still think armies wouldn't make the people believe in them.

Teacher: Another one, Mark?

Mark: Well, in industry, it would have an oil industry.

Teacher: Why do you think it would have an oil industry?

Mark: Because they said that the government was getting half the profits from the oil produced within the country.

Application of Knowledge Typescript

Teacher: And if they get half the profits from this oil industry, what would that lead to?

Mark: A better economic standard of living in the country.

Teacher: In which way? Now when you say better economics of living....

Mark: Well, they get more money so they can buy some more stuff.

Teacher: Such as? What kind of stuff would they buy?

Mark: Machines, and if they had, they would put some dams on the river there, and they could make the electric power.

Teacher: And you mentioned machines. Now machines for what?

Mark: Whatever they, tractors or whatever they needed them for.

Teacher: And you would bring that right over here to farming. Any other machines?

Shannon: Well, they would get a few machines for factory use, and then collect the materials that they got out of the factory, and then they would get more money, and they could get more factories and machines and start all over.

Teacher: So you would see this oil industry giving them money to get machines for factories, and that would give them more money when they manufactured this material, and then what would they do with that?

Shannon: Get more machines and they would send some out to other countries.

Teacher: Lange?

Lange: Well, by the looks of the map on the country, it looks as though it should have quite a bit of farming land.

Teacher: And what would this mean if they had quite a bit of farming land, Lange?

Lange: Ah, it wouldn't need very much, it wouldn't need to import very much food, if any.

Teacher: Carl, have you thought of something now as to what you'd expect to find in this country?

Carl: Well, if you want to go over there, you'd find that it really, really changed.

Teacher: In what way, Carl?

Application of Knowledge Typescript

Carl: Well, the camels and everything, ah, less cars.

Teacher: Barbara?

Barbara: I don't think the customs, that the men would wear long white shirts to their ankles. I think they'd probably wear pants too.

Teacher: Let's pursue just this one thing a littl bit further. Now you've mentioned factories, we mentioned factories down here too to new clothing. Now would there by any other kinds of factories that you feel might be developed, besides that to manufacture some new type of cloth? Besides weaving wool?

Barbara: Well, beside the cloth, tools.

Teacher: What?

Barbara: For factories that might be making new tools and things.

Teacher: Any special kind of tools?

Barbara: Ah, well, tractors and, ah, maybe even hand tools.

Teacher: Betsy?

Betsy: I think, instead of making whole tractors, they would just make parts of tractors, and then bring the other parts into the country and then put it together.

Teacher: Mark?

Mark: Well, I think there might be ah, other minerals mined besides oil, because it, the nomad tribes, that means, well they kind of wander around, and they couldn't get enough food for their animals, probably_____or something like that, and they probably could find some other mineral in there.

Teacher: This might be another industry then. Now, with all these things we have up here, what are you saying about this country today, as compared to the information we have on its past history. Tricia?

Tricia: That it's got more modern from when it was when it was like that.

Teacher: And some of you said, I think it was Barbara, wasn't it, and I saw Shannon up here nodding agreement, that she had an idea which country this might be. Does anyone have an idea even yet, as to which country it might be?

Application of Knowledge Typescript

Shannon: Well, I can't remember what the whole country is called but Jordon is in there some place.

Teacher: Barbara, does this go along with what you were thinking?

Barbara: Uh uh.

Teacher: Do you have a name for it?

Barbara: Israel.

Teacher: Israel, you think. Well, let's take a look at the atlas, as nearly as those in the back can see it, and see if we can decide just which country it is.... Right in there by Jordon. She's very close. It happens to be Iraq.

Shannon: Iraq.

Teacher: Have you heard of that, Iraq?

Pupils: Yes.

Teacher: Now, let's take some time out. We have the atlas and some other materials here for you to look at, and look up on Iraq and verify our information. How near accurate were we or how far off were we? Would you like to take off your microphones now and you may do some research quickly.

Thirty minutes allowed for research.

Now, that you've had time to do your research, let's see how much you found out about our prediction. Shannon?

Shannon: Well, I talked about education. In Iraq, public schools are free and the law requires children between the ages of six and twelve to attend, and many children do not go to school because of the shortage of crops and teachers and about eighty-four of every hundred persons, cannot read or write. The government has improved the educational facilities of the country by building many new schools and increasing the number of teachers. Bagdad has a government-operated university.

Teacher: Now, you had told us that there would be academies and universities, and you thought they would be on a level with some of the other countries. How does this information fit with your original thought?

Shannon: Well, it's just partially true because they're not really up to our society yet.

Teacher: Barbara?

Application of Knowledge Typescript

Barbara: I thought that, ah, the women wouldn't wear veils anymore. Some of them still do and then some of the women wear American clothes.

Teacher: Well, this is partially true for some, and this would be true, not woolen clothing.

Mark: They're still wearing woolen clothes.

Teacher: They still do.

Mark: And the men still wear long robes...sometimes.

Teacher: Let's get that straight. Sometimes. Ok. Tricia?

Tricia: Well, on agriculture, the machines and better farming methods isn't very true. The government brings, ah, a few tractors and things, but mostly they still use just hand tools and wooden plows. But the animal power isn't true, and the different crops and grains are mostly barley and dates.

Teacher: And that's just what we had over here too, wasn't it? Carl, what did you find?

Carl: Well, they used the rivers for irrigation, and one side of the, oh, I don't know the name of the river, but anyway, one side is all irrigated, and ah real green, and the other side is just dry, rocky dirt.

Teacher: Ron, what did you find?

Ron: In 1962, Iraq produced three hundred and sixty-six and five-tenths million barrels of oil.

Teacher: And so they do have an oil industry.

Ron: Yah.

Teacher: That much was right.

Kathy: Well, on trade, well, Iraq's biggest export is petroleum, and then the second biggest one is on grain and wool.

Teacher: We didn't have much for exports. We just put an oil industry, didn't we? Christy?

Christy: Well, Iraq is really rich in oil. That's about the richest thing they got there, and it's the third richest oil producing country in Eastern Asia.

Mark: It's the sixth one.

Application of Knowledge Typescript

Betsy: In religion, I said that I didn't think that they forced people to believe what they wanted them to. Well, it didn't say anything about this, but it said most of the people were Moslems and the country also had small groups of Christians, Jews and persons of other faiths. And Iraq is complete, has complete religious freedom throughout, which means that they don't force it.

Teacher: We hadn't covered much of that, other than it was going towards more modern religion.

Betsy: The Christianity would be one of these.

Teacher: Would be one of these. Did you find anything out about this meat? That was one of the points it brought out, that maybe they were eating meat.

Lange: Yes, they do eat meat.

Teacher: That had been forbidden. Jim?

Jim: I found out that three fourths of the world's ah, oil reserves are in underground pools in Iraq, Iran and in the Arabian peninsula, and they use animals for meat, and they supply cheese, and they have a thousand markets.

Teacher: Mark?

Mark: Well, I found two things. They have, besides the barley and dates, they grow cotton, rice, tobacco, wheat, wool and something called millet, and they also mine salt, coal, gypsum and sulphur, besides oil.

Teacher: Millet is a grain. Matthew?

Matthew: Well, they still use cattle and horses a lot. They use cattle and horses, oh, three times as much as they use cars. And they do eat cattle, and they use horses for transportation and for, ah, sometimes they use them for food.

Teacher: This part was right here, there are few cars. Ron?

Ron: Ah, in 1960, the Middle East produced, produced two hundred and sixty four million metric tons of oil.

Teacher: And Betsy?

Besty: Ah, I'd like to say about the horses, they also use pure blooded Arabian horses for racing.

Teacher: Lange?

Application of Knowledge Typescript

Lange: I've got several things. It has 5 major oil fields and 12.5 percent of estimated, ah, of world oil.

Teacher: We've had oil again and again and again. This is what they're basing things on. Now....

Lange: And also, 5 percent of the people are nomads.

Teacher: How does that fit with what you were thinking before?

Lange: Well, I said that fewer people would be nomads because it would be harder to live on....

Teacher: I know, excuse me, some of you still have some things to say, but as we look at this now, and then if we need to, we can discuss these other things later, how do you feel about your predictions about this country? How do you feel, Christy?

Christy: I think they're pretty much, sometimes, most of them there are pretty much the same as we'd guessed it.

Teacher: Matthew, what was your feeling?

Matthew: They were pretty much alike...we, we guessed them pretty good.

Teacher: Well, how do you suppose you were able to guess them pretty good? You called it guessing.

Matthew: Well, it wasn't exactly guessing. You just kind of take the patterns of other countries and you can put them into this country, and just kind of work it out.

APPLICATION OF KNOWLEDGE OBSERVATION GUIDE

Teacher ____________________

Observer ____________________

Grade and Subject ___________

I. Open-Application Question ____

____

Tally

Students Responded With

_____Original idea

_____Idea built from another idea

_____Number of original ideas

____

None (Pupil Participation) 100 Percent

II. Focusing-Application Question(s) ________________________________

____

____

____

Tally

Student Behavior

_____Able to give substantiating data

_____Unable to give substantiating data

_____Extended idea

____

None (Pupil Participation) 100 Percent

Application of Knowledge Observation Guide

III. Relating-Analysis Question(s) ____________________________________

____

____

____

Tally

Teacher Behavior

_____Called for perceiving cause and effect relationship

_____Called for perceiving relationship between or among factors

_____Called for substantiation

_____Supported student

Student Behavior

_____Gave supporting evidence

_____Extended idea

_____Extended initial idea and related to another idea

_____Built upon his own idea

_____Built upon another student's idea

_____Filled in missing links in chain

_____Disagreement between pupils

____

None (Pupil Participation) 100 Percent

IV. Inclusive-Interpretation Question ______________________________

____

Tally

Student Behavior

_____Combined two or more ideas

_____Summarized all ideas

____

None (Pupil Participation) 100 Percent

V. Verification Procedure

Check

_____Students gathered data to verify predictions

Application of Knowledge Observation Guide

_____Teacher acted as authority to verify

_____Pupils verified from their own knowledge base or opinion

What did you learn from this observation about the thought processes of the students involved?

APPLICATION OF KNOWLEDGE
LABORATORY EXPERIENCE

Content:	Participants are assigned in teams to teach the cognitive process of application of knowledge. One member teaches, the other(s) observe and record data. Following the lesson the teacher is provided with objective feedback of the events of the lesson.
Leadership Materials:	Application of Knowledge, Leadership Notes
Participant Materials:	Application of Knowledge Sample Questions Application of Knowledge Observation Guide
Rationale:	To provide intellectual and emotional experiences which insure accommodation of skills to personal teaching style To develop skills in obtaining and utilizing systematic and objective data
Objective:	After teaching a lesson based on application of knowledge principles, with observation providing systematic and objective feedback, each participant will demonstrate the accommodation of the process to his teaching style by utilizing it in future teaching activities.

The discussions below are designed to provide suggestions for implementation within all three of the alternate instructional formats:

I. Workshop

II. Extension Course

III. Methods Course

Sequence	Time	Group	Activity
A			Preinstructional Planning 1. See the specific instructions in the section, Preinstructional Arrangements, pages 29-34.)
B	15	SG	Assignment of Laboratory Experience 1. Announce specific assignments: Time Location Team members 2. Refer to the Application of Knowledge Observation Guide. 3. Discuss Data-Collection Roles a. In the case of both the workshop format and the extension course format, one participant teaches and the other observes and takes data using the observation guide as the instrument for collecting sepcific data. In the case of microteaching, two participants take data. b. Caution participants to avoid value judgments in data collection. Attempt to collect objective and specific evidence of behavior.

Application of Knowledge

Sequence Time Group Activity

c. Review the observation guide and discuss any questions or concerns.

4. Review Critique Procedure

   a. Following each teaching session, team members will confer. Utilizing the observation guide, the observer(s) will give feedback to the teacher concerning the events of the lesson.

   b. AVOID VALUE JUDGMENTS. Don't tell a teacher that is was a "good" lesson, or a "bad" lesson. Tell him what happened and let him judge for himself. The critique session should be a joint inquiry into the data with an analysis of cause and effect relationships.

5. Advise participants to do the following:

   a. Be at the classroom assigned a few minutes in advance.

   b. Confer briefly with the classroom teacher. Invite him to observe if he likes, but if he does not wish to remain in the room, determine where you can find him in case you finish before the period is over.

C 60-90 SG Plan Laboratory Experience

1. In all three of the instructional formats, time must be provided for the teams to work together and develop an appropriate laboratory experience. (The ideal situation exists when it is possible for each team to develop

Application of Knowledge

Sequence	Time	Group	Activity
			strategies which are consistent with the curriculum being taught in that room.) 2. Refer to Application of Knowledge Sample Questions. Indicate that these are only sample questions. Participants are free to develop an opening question with which they will be most comfortable. Point out that the application of knowledge task they have developed for their instructional unit may be appropriate for use. 3. Require participants to develop a cognitive map of expectations, i.e., have them indicate in writing the anticipated responses for each question to be asked in the teaching strategy. 4. Ask participants to check their cognitive map with a leader before leaving.
D	60- 180	Schools	Laboratory Experience 1. Participants will spend the appropriate period of time operating as teams in the teaching practicum.

Application of Knowledge

Sequence	Time	Group	Activity
E	30	SG	Reaction to Laboratory Experience 1. This is a very important session. Its greatest value is in sharing experiences. Use the observation guide if it seems advisable to facilitate the discussion, but allow time for participants to unload both ideas and feelings. 2. Do not expect to continue for an extended period of time beyond this point. Participants will be far too emotionally exhausted to give full attention.

APPLICATION OF KNOWLEDGE
SAMPLE QUESTIONS

1. If you and your family were going to live in a "primitive" area (describe area), what would you need to take with you?

2. What would happen if gold were discovered near our community?

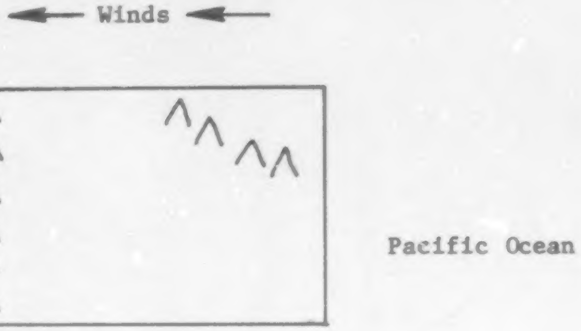
3. What would happen if all transportation to and from our community were cut off for a period of twelve months?

4. What would happen if all of the food that a person needed were reduced to just one pill a day?

5. What would happen if the average temperature of this area were to increase by 20 degrees?

6. What would happen if the American school system decided to follow the practice of training only the best students.

7. What would happen if the topographical features of __(Oregon)__ remained the same, but the Pacific ocean was the east side of the state, and the prevailing winds were from east to west?



8. What would happen if suddenly everyone in India could read and write?

APPLICATION OF KNOWLEDGE
OBSERVATION GUIDE

Teacher ____________________

Observer ____________________

Grade and Subject __________

I. Open-Application Question ____

____

Tally

Students Responded With

____Original idea

_____Idea built from another time

_____Number of original ideas

____

None (Pupil Participation) 100 Percent

II. Focusing-Application Question(s) ______________________________

____

____

____

Tally

Student Behavior

_____Able to give substantiating data

_____Unable to give substantiating data

_____Extended idea

____

None (Pupil Participation) 100 Percent

III. Relating-Analysis Question(s) ________________________________

____

____

____

Application of Knowledge Observation Guide

Tally

Teacher Behavior

_____Called for perceiving cause and effect relationship

_____Called for perceiving relationship between or among factors

_____Called for substantiation

_____Supported student

Student Behavior

_____Gave supporting evidence

_____Extended idea

_____Extended initial idea and related to another idea

_____Built upon his own idea

_____Built upon another student's idea

_____Filled in missing links in chain

_____Disagreement between pupils

None (Pupil Participation) 100 Percent

IV. Inclusive-Interpretation Question ______________________________

____

Tally

Student Behavior

_____Combined two or more ideas

_____Summarized all ideas

None (Pupil Participation) 100 Percent

V. Verification Procedure

Check

_____Students gathered data to verify predictions

_____Teacher acted as authority to verify

_____Pupils verified from their own knowledge base or opinion

What did you learn from this observation about the thought processes of the students involved?

REVIEW OF PROCESSES

Content: These exercises are designed to involve participants in a review of the theory, purposes and techniques presented previously in the training program.

Leadership Materials: Review of Processes, Leadership Notes

Participant Materials: Thinking Processes Review

Strategy Moves

Bibliography

Rationale: To provide a review for participants

To provide the instructor with feedback regarding participants' accommodation of the processes to their own teaching theory and practice.

Objective: The review of the processes is designed to:

1. Review processes for participants through the discussion
2. Provide a means for viewing the program as a whole
3. Afford an opportunity to express personal opinions which will serve as feedback for the instructor.

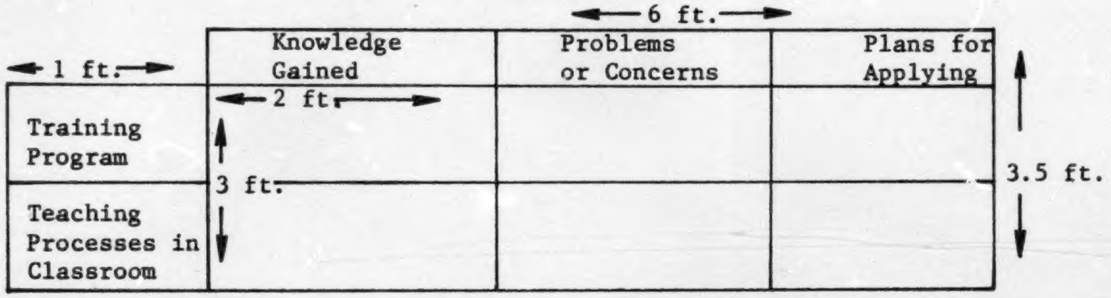
REVIEW OF PROCESSES

The purpose of this unit is to provide participants with an opportunity to review the thinking processes as a whole and to express their concerns and opinions regarding their application.

Sequence	Time	Group	Activity
A-1	60	SG	Review of Processes 1. Refer to Thinking Processes Review. 2. Divide the participants into subgroups of two to four members and assign each group one or more questions from the list. Allow 30 minutes for participants to discuss their questions and acquaint themselves with the others. 3. Reconvene as a large group and share responses. Allow the total group to respond to each question if they have comments.
A-2	60	SG	Alternate Review of Processes The following can be used either after the previous activity, or as an alternative activity. Its value lies in providing the opportunity for individual members to express their feelings regarding the specific processes and their application. 1. Arrange a large information display as illustrated on the next page.

Review of Processes

Sequence Time Group Activity



	Knowledge Gained	Problems or Concerns	Plans for Applying
Training Program			
Teaching Processes in Classroom			

2. Divide group into small groups of three or four members. Provide strips of paper three inches by two feet on which to write each specific item for dimensions of information display. Let groups fasten data to chart. Expect duplication of items. Participants need to know others feel the same as they. Allow 30 minutes for this activity.

3. When charts have been completed, reconvene total group and lead participants through a question sequence such as:
    a. What do you notice about the knowledge we've learned?
    b. What is alike? How do you account for these similarities?
    c. What do you notice that is different? How do you account for these differences?
    d. What generalizations can you make about the knowledge we've learned?

Review of Processes

Sequence	Time	Group	Activity
			(Repeat question sequence for each dimension.) As a final question, ask, "What generalizations can be made regarding all three areas on the chart?"
B	30	SG	Review Strategy Moves 1. Refer to Strategy Moves and allow 10 to 15 minutes for the group to read. 2. Indicate this is a final overview of the processes. 3. Call for any questions or concerns and allow participants to interact.
C	5	SG	Bibliography 1. Refer to the Bibliography and indicate that it represents a selected list of references for additional information on thinking processes.
D		SG	Adjourn Instructional Program Adjourn the program with whatever evaluation and/or closing procedure seems appropriate.

THINKING PROCESSES REVIEW

The questions below may be asked of you by your colleagues. How would you respond?

1. My students deal with ideas quite easily as they have parents who talk to their children about ideas. Why should I spend the time to develop ideas with them? Wouldn't it be more economical in time and effort to just give them the ideas?

2. When we have class discussions, the verbal children take over. One-third of the class never contributes. What can I do about this?

3. As an exercise in grouping, I give children headings and have them list everything they can think of as examples of the headings.

4. In concept diagnosis they get so many things listed that the grouping becomes too complicated and never gets finished.

5. I was taught to intrude into a discussion as little as possible. This seems awfully "teacher controlled" to me.

6. What kind of materials do I need to teach this way and how do I get them?

7. If needed information is not available, what does the teacher do?

8. My students want to put every fact they have learned into the information display. How do I solve this problem?

9. It seems to me that the making of an information display is a great deal of work for just one discussion.

10. I alternate a day's research with one day of discussion. My students seem unable to go beyond factual data.

11. My students do not verbalize well. How can I use this process when it appears to be dependent upon the ability of students to verbalize?

12. How can this be a really practical method for classes of 36 students?

13. If you use these processes, how do you grade a student for report cards?

14. My students do such wide research, I don't always know if their information is accurate.

15. This method takes so much time that I could never get over the materials I'm supposed to cover.

16. How can you expect the very poor reader, or nonreader, to participate successfully in this method?

STRATEGY MOVES

The following charts present an overview of the basic, enabling and facilitating strategy moves relative to the:

1. Rationale supporting each move
2. Cognitive and/or affective intent of the move
3. Required teacher action
4. Possible student response

OPEN-MEMORY QUESTION (BASIC STRATEGY MOVE)

Rationale	Intent	Teacher Action	Student Action
A discussion which is designed to ask students to analyze relationships within a body of data is successful depending upon at least two factors: 1. A body of data is available for analysis 2. Students feel free to express their ideas Active interaction usually results from: 1. Initiating such a discussion with a question designed to call upon the student to read, recall or otherwise present the body of data to be analyzed 2. Stating the question in a form which is completely free of "Guess what's on my mind"	An attempt to elicit a universe of data upon which to operate An attempt to provide an opportunity for the student to respond without fear of being judged "right" or "wrong" An attempt to diagnose what the student knows concerning the data to be analyzed An attempt to elicit divergent ideas in the form of predictions relative to a problem situation	A question is asked which calls for the recall or reading of any information the student wishes to give from a body of data to be analyzed. "What comes to mind when you think of the word 'communism'?" "What did you see take place in the experiment?" "What have we been able to find out about India?" "What would happen if water became abundantly available in the desert?"	Silence Responds with data which may be either relevant or irrelevant to the discussion topic.

FOCUSING-MEMORY QUESTION (BASIC STRATEGY MOVE)

Rationale	Intent	Teacher Action	Student Action
In a discussion which is designed to ask students to draw relationships between specific points within a field of data, questions need to be asked which focus the student's attention on the specific points to be compared, contrasted or related.	An attempt to elicit specific points from a body of data An attempt to focus attention on specific points within a body of data	A question is asked which calls for the recall or reading of specific information in a body of data to be analyzed. "What did the film tell us about transportation?" "How did Toshi feel about the Golden Crane?" "What happened when we added acid?" "What industries do they have in Bolivia?"	Silence Responds with specific points from a body of data.

INTERPRETATION QUESTION (BASIC STRATEGY MOVE)

Rationale	Intent	Teacher Action	Student Action
Considering interpretation as a process of relating facts, concepts, values and skills, an essential element is one of drawing a relationship between two or more points in the data being analyzed. The relationship called for may be: Comparative Functional Cause and Effect The question often asks for substantiating support for the answer. The verbalization of perceived relationships is the heart of the generalizing process.	An attempt to elicit comparing, contrasting and relating of specific points within a body of data An attempt to elicit a logical cause and effect relationship between specific points in a body of data An attempt to elicit a functional relationship between specific points in the data An attempt to draw conclusions from statistical evidence	A question is asked which calls for a comparative relationship. "What differences do you notice?" A question is asked which calls for a cause and effect relationship. "What is the effect of the climate of this area and the way the people live?" A question is asked that calls for the statement of how one thing functions in relation to another. "How were the people able to maintain such a high standard of living?" A question is asked which requires students to relate statistical evidence and to draw a conclusion.	Silence Responds with specific data in form of relationship. "Colony I had 20 inches of rainfall per year. Colony II had 10 inches per year." Responds with generalized statement of relationship without supporting evidence. "Colony II was a more industrialized country." Responds with generalized statement of relationship with supporting evidence. "The availability of natural resources resulted in a more industrialized economy in Colony II."

INCLUSIVE-INTERPRETATION QUESTION (BASIC STRATEGY MOVE)

Rationale	Intent	Teacher Action	Student Action
The processes of interpretation and application call for: 1. Analyzing specific data 2. Drawing relationships between specific points and verbalizing abstractions 3. Examining these relationships and verbalizing higher level abstractions The end product is one of stated generalizations or inferences which: 1. Are abstract in nature 2. Are inclusive of much information 3. Contain a statement of condition The inclusive-interpretation question calls for high level abstraction.	An attempt to elicit the verbalization of high level abstractions which are: 1. Inclusive of much data 2. Stated in abstract terms 3. Contain a statement of condition	A question is asked which calls for: 1. Conclusion 2. Summary 3. Inferences 4. Generalizations "What conclusions could we draw from our discussion?" "How could we summarize what this film has presented?" "What could we say that might be true of other cultures?" "What general statements could we make from all of the information we have discussed?"	Silence Responds with specific data. "Colony I has much agriculture. Colony II has many imports and exports." Responds with statement of relationship between specific points in the data. "People lived about the same in both areas." Responds with high level abstraction in the form of inferences or generalizations without statement of condition. "Climate affects the way people live." Responds with hight level abstraction in the form of inference or generalization with statement of condition. "Climate is likely to have an effect on the way people live."

ACCEPTING (ENABLING MOVE)

Rationale	Intent	Teacher Action	Student Action
The ability and desire to try new things, to experiment with new experiences without feeling threatened, is developed in an atmosphere in which experimentation and autonomy are encouraged. People develop feelings of being liked, wanted and successful by experiences which indicate that others like them, want them and consider them successful. People acquire the ability to be open, trusting and sensitive to others by having had satisfying experiences in interaction with others. If a student must function in an atmosphere of criticism and fear of failure, he must guard and protect what he can do successfully and only cautiously risk trying new experiences.	An attempt to accept a student's idea or question in a nonjudgmental manner An attempt to communicate to the student that his ideas and feelings are legitimate and valued	A pupil's statement is written without any teacher comment. "That's an interesting idea." "All right." "Let me write that idea here, Bill, and we'll come back to it in a few minutes." A reply is made which avoids the overt reward of: "Good" "Very good" "Excellent"	Silence Participates actively in the discussion. Makes exploratory attempts to participate.

SUPPORTING (ENABLING MOVE)

Rationale	Intent	Teacher Action	Student Action
Many students, perhaps most, have had experiences in classrooms in which there was an atmosphere of criticism and fear of failure. People acquire the ability to try new things, to express their ideas and experiment with new experiences by being made to feel that they are an acceptable, worthy person. If a student is made to feel that he's a failure--he will be a failure. If he is made to feel that he is a success, he will be a success.	An attempt to give psychological support to a student who is shy or otherwise reluctant to participate An attempt to give psychological support to the student who is having difficulty forming a response to a question	Comment is made to encourage participation at the level and to the extent the student chooses. "All of you can participate to the extent that you wish. *I* will not be judging your answers, but will help *you* to judge your own answers." Comment is given to encourage autonomy of thinking. "That's all right; take a minute to think." "Go ahead, express it in any way that you like." "Would you like to think about it for a few minutes and we'll come back to you."	Silence Makes hesitant attempts to participate. Responds with active participation.

SILENCE (FACILITATING MOVE)

Rationale	Intent	Teacher Action	Student Action
Many teachers have an incapacity to tolerate silence after asking a question. However, a most important element in any discussion is allowing the student time to think.	An attempt to allow the student time to think without feeling under pressure to respond immediately with the first thing that comes into his mind	Silence	Silence Responds with information.

CLARIFYING (FACILITATING MOVE)

Rationale	Intent	Teacher Action	Student Action
Oftentimes, students use terms or ideas that are not clearly understood either by themselves or others involved in the interaction. To facilitate open, clear verbal interaction, it is important to clarify such terms or ideas.	An attempt to understand specifically what the student means by a particular term, phrase or statement An attempt to insure that other students understand what a particular student means by what he has said	A question which asks the student to give more information. "I'm not sure I understand; can you be more specific?" A question which asks for an example. "Could you give us an example of what you mean?" A question which asks the student to paraphrase. "I'm not sure I understand, could you state that another way?" A question which asks another student to paraphrase. "Could someone else state what Bill is saying?" A comment which paraphrases. "By 'customs,' for example, do you mean the removing of shoes before entering the house?"	Silence Gives additional information. Gives an illustrative example. States in a different form. Another student restates the idea as he perceives it. The teacher gives a specific example of what the term means to him and asks if this is correct.

SUMMARIZING (FACILITATING MOVE)

Rationale	Intent	Teacher Action	Student Action
Many students bury the idea they are trying to express in a long discourse, often losing their listeners in the process. To help the student gain the skill of clearly and concisely communicating ideas, and to enable the listeners to obtain the main idea of the discourse, the student should be asked to summarize what he has said.	An attempt to elicit the main idea from an extensive student comment	A question is asked which calls upon the student to present the main idea of what he has just stated. "That was a long statement. Could you put it in one sentence?" "How could I put that on the board?"	Silence Has difficulty summarizing and stating the main idea. States the main idea in a succinct statement.

SUBSTANTIATING (FACILITATING MOVE)

Rationale	Intent	Teacher Action	Student Action
Whenever a student responds with a comment in which the basis for the statement is not clearly evident, substantiating evidence should be requested. Requesting supporting evidence helps the student avoid an "overgeneralization." ("People in other countries are very religious.") Also, he becomes sensitive to the necessity of substantiating his generalized statements with logical supporting evidence. His ability to communicate abstract ideas clearly, succinctly and directly is greatly enhanced.	An attempt to determine the knowledge which served as the basis of a student's comment To the extent possible, the question should be posed as a "what," rather than "why." "What" is impersonal "Why" is personal "What" is freeing "Why" is binding "What" focuses on ideas "Why" focuses on the contributor	A question is asked which calls for logical evidence in support of a student's comment. "What happened in the story that made you feel Toshi was angry?" "What information did you find that leads you to believe industry depends upon imports?" "What factors led you to predict agriculture would be highly developed?" "What is the basis for grouping _______, _______ and _______ together?"	Silence Responds with specific data which logically supports the original statement. Responds with data which does not clearly support the original statement.

EXTENDING (FACILITATING MOVE)

Rationale	Intent	Teacher Action	Student Action
In the process of moving from specific data through relationships within data to high level abstractions, a particular student's statement may often be profitably extended to the inclusion of more data, and/or extended to higher level of abstraction. The emphasis is upon a particular student's comment which can be extended both quantitatively and qualitatively.	An attempt to add to a particular student's comment to either increase the inclusiveness or add to the abstractness of the comment	A question is asked which calls for more information to a particular student's comment. "Can someone add to what Bill has stated?" "What other effects do you see happening as a result of industrial growth?" A question is asked which requires the student to extend a comment to a higher level of abstraction. "What would be the consequence or result of having more teachers?" "Would this be true under all conditions?" "How could that be stated so it would be true based upon the information we have studied?"	Silence Responds with additional data or ideas. "Industrial growth will probably also result in a high standard of living." Responds with a higher level abstraction. "The climate not only affects their food supply, but their culture in general." Responds with statement of condition. "Environment can be controlled by modern technology, but it is likely to have an effect on how people live."

MAPPING (FACILITATING MOVE)

Rationale	Intent	Teacher Action	Student Action
The teacher should, in advance of any discussion, consider the range of ideas that can be anticipated. Having such a "cognitive map" in mind can help the teacher probe for those dimensions which have not been expressed by the students.	An attempt to elicit more and varied responses in dimensions of the discussion which the teacher feels the students should be aware of but have not expressed The problem is one of probing for information, without giving information	A question is asked which calls for information in a new area. "Can you think of jobs that people might have, other than the ones we have mentioned?" "Can you think of any areas that we have missed?"	Silence Responds with additional information in previously mentioned areas. Responds with new information in new areas.

BIBLIOGRAPHY

Almy, Millie. YOUNG CHILDREN'S THINKING: Studies of Some Aspects of Piaget's Theory. New York: Teachers College, Columbia University, 1966.

Amidon, Edmund and Elizabeth Hunter. IMPROVING TEACHING: The Analysis of Classroom Verbal Interaction. New York: Holt, Rinehart and Winston, 1966.

Aschner, Mary Jane and Charles E. Bish, editors. PRODUCTIVE THINKING IN EDUCATION. Washington, D. C.: National Education Association, 1968.

Bruner, Jerome S., editor. LEARNING ABOUT LEARNING: A CONFERENCE REPORT. Washington, D. C.: U. S. Office of Education, 1966.

Bruner, J. S., et al. STUDIES IN COGNITIVE GROWTH. New York: John Wiley and Sons, 1966.

Bruner, J. S., et al. STUDY OF THINKING. New York: John Wiley and Sons, 1956.

Bruner, J. S. TOWARD A THEORY OF INSTRUCTION. Cambridge, Massachusetts: Belnap Press of Harvard, Revised, 1968.

Combs, Arthur W., editor. PERCEIVING, BEHAVING, BECOMING. Yearbook, Washington, D. C.: Association for Supervision and Curriculum Development, National Education Association, 1962.

Combs, A. W. PROFESSIONAL EDUCATION OF TEACHERS: A Perceptual View of Teacher Preparation. Boston: Allyn and Bacon, 1965.

DeCecco, John P., editor. HUMAN LEARNING IN THE SCHOOL: Readings in Educational Psychology. New York: Holt, Rinehart and Winston, 1963.

DeCecco, J. P. PSYCHOLOGY OF LANGUAGE, THOUGHT AND INSTRUCTION. New York: Holt, Rinehart and Winston, 1966.

Dewey, John. HOW WE THINK: A Restatement of the Relation of Reflective Thinking to the Educative Process. Boston: D. C. Heath, 1933.

Donaldson, Margaret. STUDY OF CHILDREN'S THINKING. New York: Barnes and Noble, 1963.

Fair, Jean and Fannie R. Shaftel, editors. EFFECTIVE THINKING IN THE SOCIAL STUDIES. Washington, D. C.: National Council for the Social Studies, 1967.

Flanders, Ned A. "Intent, Action, and Feedback: A Preparation for Teachers," Journal of Teacher Education, 14:3-63; September 1963.

Bibliography

Frazier, Alexander, editor. FREEING CAPACITY TO LEARN. Washington, D. C.: Association for Supervision and Curriculum Development, 1960.

Frazier, A., editor. LEARNING MORE ABOUT LEARNING. Washington, D. C.: Association for Supervision and Curriculum Development, 1959.

Gagne, Robert M. CONDITIONS OF LEARNING. New York: Holt, Rinehart and Winston, Revised, 1970.

Gallagher, James J. TEACHING GIFTED STUDENTS: A Book of Readings. Boston: Allyn and Bacon, 1965.

Guilford, Joy P. THE NATURE OF HUMAN INTELLIGENCE. New York: McGraw-Hill, 1967.

Guilford, J. P. "Intelligence: 1965 Model," American Psychologist, 6: 14-16; January 1966.

Hullfish, H. Gordon and P. G. Smith. REFLECTIVE THINKING: The Method of Education. New York: Dodd, Mead, 1961.

Hunt, Joseph M. INTELLIGENCE AND EXPERIENCE. New York: The Ronald Press, 1961.

Isaacs, Susan. INTELLECTUAL GROWTH IN YOUNG CHILDREN. New York: Humanities Press, 1930.

Kagan, Jerome, H. A. Moss and I. E. Sigel. "Conceptual Style and the Use of Affect Labels," Merrill-Palmer Quarterly, 6: 261-275; July 1960.

Klausmeier, Herbert J. and Chester W. Harris. ANALYSES OF CONCEPT LEARNING: Proceedings. New York: Academic Press, 1966.

Ojemann, Ralph H., E. J. Maxey and B. C. F. Snider. "The Effect of a Program of Guided Learning Experiences in Developing Probability Concepts at the Third Grade Level," Journal of Experimental Education, 4: 18-20; Summer 1965.

Peel, Edwin A. THE PUPIL'S THINKING. London: Oldbourne, 1960.

Piaget, Jean. THE PSYCHOLOGY OF INTELLIGENCE. London: Routledge and Kegan Paul, 1950.

Raths, James, J. R. Pancella and J. S. Van Ness. STUDYING TEACHING. Englewood Cliffs, New Jersey: Prentice-Hall, 1967.

Raths, Louis E., M. Harmin and S. Simon. VALUES AND TEACHING. Columbus, Ohio: Merrill Books, 1966.

Rokeach, Milton. OPEN AND CLOSED MIND. New York: Basic Books, 1960.

Bibliography

Sanders, Norris. CLASSROOM QUESTIONS: WHAT KINDS. New York: Harper and Row, 1966.

Shaftel, Fannie R. and George. ROLE PLAYING FOR SOCIAL VALUES: Decision Making in the Social Studies. Englewood Cliffs, New Jersey: Prentice-Hall, 1967.

Sigel, Irving E. A TEACHING STRATEGY DERIVED FROM SOME PIAGETIAN CONCEPTS. Social Science Education Consortium, Publication No. 113. West Lafayette, Indiana: Purdue University, 1966.

Smith, B. Othanel. A STUDY OF THE STRATEGIES OF TEACHING. Urbana, Illinois: Bureau of Educational Research, 1967.

Taba, Hilda. CURRICULUM DEVELOPMENT: THEORY AND PRACTICE. New York: Harcourt, Brace and World, 1962.

Taba, H. TEACHING STRATEGIES AND COGNITIVE FUNCTIONING IN ELEMENTARY SCHOOL CHILDREN. San Francisco: San Francisco State College, 1966.

Vygotsky, Lev S. THOUGHT AND LANGUAGE. Cambridge: MIT Press, 1962.

Waetjen, Walter B., editor. HUMAN VARIABILITY AND LEARNING. Washington, D. C.: Association for Supervision and Curriculum Development, 1961.

Waetjen, W. B. and R. R. Leeper, editors. LEARNING AND MENTAL HEALTH IN THE SCHOOL. Washington, D. C.: Association for Supervision and Curriculum Development, 1966.

APPENDIX A

GLOSSARY OF TERMS

ACCEPTANCE	Student responses accepted without judgment.
AUTONOMOUS LEARNING	The learning act in which the learner acquires data, discovers the relationships that exist within the data, generalizes or infers from the data, and applies acquired knowledge to a new situation, independent of cues from an outside authority.
CLARIFYING	Seeking information which makes the meaning of a statement or word clear.
CONCEPT	A word or phrase which denotes a category of information. Level of abstraction may vary from relatively concrete to highly abstract. For the individual, concepts are in a continuous state of modification.
CONVERGENT THINKING	Thought patterns which follow a logical sequence to an acceptable, conventional or predetermined conclusion.
DISCUSSION SKILLS	The skills needed by both students and teachers to create open, effective verbal interaction.
EXPRESSION	Communicating knowledge to others by verbal or visual media.
FACTUAL DATA	Knowledge consisting of what is widely accepted as objectively true. Nonsubjective knowledge, which can be verified by observation, experimentation or reliable testimony.
FOCUSING QUESTION	A question designed to direct attention to a specific point among a number of ideas. To a degree, any question focuses. For example, the open question, "What happened in the film?" focuses on events. "What did you see in the film?" focuses on objects or items. As used in this program, focusing question refers to one which focuses on more specific points than do the above examples, as, "How did Bill happen to become lost?"
GENERALIZATION	A statement of relationships among concepts, usually qualified by condition, which can be supported by evidence.
INCLUSIVE-INTERPRETATION QUESTION	A question that is designed to obtain a conclusion, summary or closure for the discussion.
INFERENCE	A statement of relationships among concepts based only partially upon evidence. A statement which goes beyond the strictly verifiable to hypothesize conjectural relationships based on known data.

Appendix A

INQUIRY	The process of solving problems with a conscious knowledge of the parts and processes of reasoning.
INTAKE	The encountering and mental reception of a new idea or experience.
INTERPRETATION QUESTION	A question designed to contrast, compare and seek logical relationships; calls for the generalizing process.
KNOWLEDGE BASE	Previously acquired information which the individual uses in processing new material.
LEARNING EXPERIENCE	An activity to foster the acquiring of new or refined knowledge, skills, attitudes or thinking processes.
LEVELS OF THINKING	Manipulation of ideas from simple to complex, concrete to abstract.
MAPPING CONCEPTUAL FIELD	Seeking specific information about the range and composition of concepts held by the learner.
OPEN QUESTION	A question designed to elicit a variety of responses, rather than a single specific answer. The primary purpose of an open question is to promote pupil participation, e.g., "What happened in the story?"
PATTERN	Repetition of a certain behavior within a discussion.
PRINCIPLE	An abstract idea supported by concepts and generalizations which have been tested over a period of time.
PROCESS	An activity or operation directed toward a particular goal.
QUESTIONING STRATEGY	A planned series of questions leading toward a specific goal.
REFOCUSING	Redirecting the discussion back to its primary topic.
SENSITIZE	To make participants aware, usually by means of firsthand experience.
SPECIFYING	Seeking greater detail or specific items of information.
SUBSTANTIATING	Providing a reason, evidence or basis for a statement.
SUMMARIZING	Stating a number of ideas in one or a few succinct statements.
SUPPORTING	Encouraging by means of verbal or nonverbal cues.